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THE TREATMENT OF THE JOINT LESIONS OF ARTHRITIS DEFORMANS.[1]

By H. PERN, M.R.C.S. (England), L.R.C.P. (London), *Melbourne.*

I WISH to thank you most sincerely for the honour you have conferred on me tonight. I am speaking on the treatment of a condition which is widespread, which is responsible for an appalling amount of suffering and which is a great financial loss to the nation.

I tried in my paper on rheumatoid arthritis to show why certain people developed rheumatic affections; to show that it was related to the highly complicated and interesting problem of immunity, either hereditary and constitutional or acquired. In other words, I tried to demonstrate that the development of rheumatism depended on the soil in which the seed was sown, on whether this soil was favourable to its growth or not, as well as on the type of the bacillus or seed sown. On these two factors depend the virulence and course of the disease.

Many workers have tried to cut off the source of the toxin by removing the so-called septic focus; many have tried to raise the immunity. But until the same type of the bacillus can be found both at the source and in the joint, neither treatment can be put on a sure basis. This may happen some day and then we may be able to prevent arthritis; but if not, arthritis will not be cured either by removing a septic focus or by raising the immunity, simply because joints act mechanically.

I think we can divide rheumatic arthritic joints into five types:

1. That classified as acute rheumatism, chiefly affecting children and young adults, the inflammation tending to resolve, leaving the joints intact. In certain cases the infection tends to become sub-

[1] Read at a meeting of the Victorian Branch of the British Medical Association on February 1, 1933.

acute or chronic, and in these it goes on to the stage of *arthritis deformans*.

2. That classified as rheumatoid arthritis, chiefly affecting children, under the heading of Still's disease, and young adults, chiefly young women. Running an acute or subacute course, this type affects numerous joints, with a tendency to cause relapse, and leaves behind a varying amount of crippling.

3. Fibrositic conditions and chronic rheumatism, chiefly occurring in adults.

4. Single joint affections with little constitutional changes, occurring at same particular period.

5. A condition classified as osteo-arthritis, very much like type 2, only not so acute, essentially chronic, affecting multiple or single joints, in both sexes, about the menopausal period.

If we wish to add another type we may add:

6. Osteo-arthritis, occurring in both sexes past the prime of life, usually in the hip joints or joint, and having a traumatic history.

The recognized opinion, I take it, is that in rheumatoid arthritis the synovial membrane is the primary tissue affected. In osteo-arthritis the bone is affected primarily, the other structures secondarily, and in those cases with a traumatic history trophic changes are set up by trauma.

Clinically all types seem more or less distinct. Yet are they? Except for the incident of age, I cannot distinguish one from the other; they all have one common factor, in that the joints in all undergo rheumatoid changes, type 1 rarely, the others as a natural law. The joints that undergo rheumatoid changes also proceed to the stages of subacute and chronic inflammation.

In my paper on rheumatoid arthritis I have pointed out that many causes give rise to arthritis. To mention a few of these: the known bacillary infections of the acute infective diseases, syphilis and gonorrhœa, chemical irritation from urate of soda in gout, trauma, and certain nerve diseases. The same thing happens in these conditions; the patients whose condition is acute tend to get well, while those whose condition from any cause becomes subacute proceed to suffer rheumatoid changes.

Inflammation, wherever situated, must obey physiological laws. So in rheumatoid arthritis there must be some common factor which is applicable to joints and to no other structures. Physiologically a joint is the fulcrum in a system of levers, so if the mechanism of the fulcrum is altered from any cause, the mechanism of the system of levers must also be altered. The correct working of that fulcrum depends on the joint proper, on the structures which are used in its function, and on proper guidance by the brain and nervous system.

In my paper on *arthritis deformans* I tried to show that arthritis, both in the acute and subacute stages, was cured by the correct use of a combination of rest and mobility. The subacute or chronic stage was reached as a result of the continuation of inflammation, set up either by the primary cause or by the incorrect use of rest or mobility.

So the key to the problem of arthritis lies in the physiology of joints.

There is another factor which varies with the severity of the disease affecting the joints and the amount of crippling, that is, exhaustion of the ductless glands, which is manifested by alteration of the mental outlook, quickening of the pulse rate, pigmentation, sweating, rapid wasting (out of all proportion to the amount of disuse), and in children stoppage of growth.

If we analyse the different groups we find the severe forms (numbers 1 and 2) occur at a period of ductless gland activity and instability, when the disease is of an acute type. Numbers 3 and 4 occur at a period of ductless gland stability, when the disease is of a mild type. Numbers 5 and 6 occur at a period of ductless gland deterioration, when the disease is of a chronic degenerative type.

Are the keys of the problem the physiology of life and the physiology of repair?

I take it that the physiology of life depends on the health of the mind and the correct fulfilment of its objective, the health of the body or the correct functioning of its organs and systems. All are dependent on one another; the failure of one must affect all, according to the part each is required to play in meeting life's needs.

In *arthritis deformans* the normal physiology is profoundly altered by crippled joints and a broken life, and the restoration of the body lies in making the mind healthy again, making the organs and systems function again properly. This can be accomplished only through the physiology of repair.

To my mind, even though it is one of abysmal ignorance, the value and interest of physiology lies in piecing together the knowledge obtained by laboratory and other scientific workers and then trying to see into the Maker's mind and His reasons in the fashioning of the human body. Though one sees through a glass darkly, yet one sees the infinite thought, the exquisite workmanship, all needs met, all dangers provided for; joints, instead of being merely joints, are works of art. Seeking in this way teaches a sense of beauty and gives one's hands a reverential touch. If anatomy and physiology were taught as one subject with that thought, it could be made fairyland. Every process, including the process of repair, which goes on in the body, is organized. That organization is performed by the nervous system, the sympathetic guided by primary instincts and the central nervous system by acquired knowledge; the agents employed are the ductless glands acting through their hormones. So if the primary instincts are at fault they must be rectified by the acquired knowledge of the central nervous system. If that acquired knowledge is at fault it can be corrected only by altering that knowledge, as hate is changed to love, despair to hope. Failure may be due to the forces of destruction being too great or to inefficient organization, leading in both cases to exhaustion. I think it is a reasonable deduction to draw, that treatment must be based on the physiology of life, inflammation and

repair, and the mechanism of joints. I want to make it quite clear that the treatment of inflammation is the most difficult, and on its successful treatment depends the success of the mechanical treatment.

As this paper deals with the mechanical treatment of joints, I can only indirectly touch on the other modes of treatment.

I worked out a short historical story of the work on joints, both by past and present workers, but have had to omit it. The workers are divided into different schools, one school using rest, another mobility, and another a combination of the two.

The world is indebted to Sir Robert Jones for putting joint work on its present basis. He laid down the principle that the function of a joint was a mechanical one and that the process of repair followed the ordinary physiological laws. My work has been entirely based on his teachings, and at the beginning of 1932, I think, I found out that the clue to joint work was in the correct use of rest and mobility in combination, not in using them individually.

Clinical Classification.

For simplicity of demonstration I shall divide arthritic joints into three groups: (i) joints affected with acute inflammation, (ii) joints affected with subacute inflammation in its various stages, (iii) stiffened joints with varying amount of destruction, but no apparent inflammation. Each group presents its own special problems. Needless to say, it is essential to make a correct diagnosis. If multiple joints are affected this is usually quite simple; if one joint is affected in early life or early adult life, the condition is probably not rheumatic; in later life it probably is.

Usually a correct estimate can be given from the history and from simple observation. This estimate can be verified by touch which, by the amount of tenderness produced, indicates the stage and extent of the inflammation present, the locality of the inflammation, whether it is in the joint proper or in structures surrounding the joint, the directions in which mobility is limited, the extent of the limitation and the causes of the limitation.

This knowledge may be corroborated by any other means, but from my experience I should say it is essential for joint work to train both the eye and the hand to serve their purpose.

Group I.

In the first group the symptoms and physical signs are those of inflammation, increase of synovial fluid, pain on movement, limitation of movement in most directions, and tenderness on pressure.

The objective is to obtain rest without interfering with the circulation or drainage, to prevent rest being carried too far, with the consequent formation of adhesions. Splints are liable to interfere with both circulation and drainage; elastic pressure by means of wool is ideal. I have explained the mode of application of such pressure in all my papers. Adhesions can be prevented by passive movement. I am absolutely certain not only that it is perfectly safe to move an acutely inflamed joint of this type, but that it is the correct treatment, with this proviso, which I cannot too strongly emphasize, that it is done correctly. If the correct method is not carried out, then moving such joints can only lead to disaster.

Each time the dressing is taken down, on an average every two to four days, the joint should once, and once only, be very slowly and gently put through the range of movement possible without producing pain or producing only slight pain. It is essential to get complete muscular relaxation, and on no account must the patient be allowed to move the joint. This treatment is continued until all the signs of inflammation have disappeared; then, and not till then, is the patient allowed to perform active movements, at first one movement in all directions, assisted, then unaided. Finally, the correct mechanical use of the joint is taught, exercises are given, and full function is allowed.

The treatment is simple and satisfactory, and I feel justified in stating that if it is carried out correctly, acute arthritis should not become chronic.

If the joint is not put at rest every time it is moved actively, fresh trauma will be produced, a condition of chronic inflammation being set up. If rest is prolonged and complete, adhesions will form, and though all inflammation is cured, the joint will be stiff and come under Group III.

Group II.

For the second group the physical signs are the same as in Group I, but not so pronounced. The joint assumes an aspect which is quite typical; there is nearly always a general enlargement and frequently an increase of synovial fluid; mobility is limited in both active and passive movement. The difficulties in treatment are almost overwhelming and, of course, depend on the extent of the inflammation. It is essential to have a clear picture in your mind of those difficulties. The general enlargement of the joint is due to a chronic infiltration of the structures surrounding the joint; the increase of the synovial fluid is due to a chronic inflammation of the synovial membrane, which may be greatly hypertrophied and villous. If the inflammation has extended to the cartilage cells and bone, they also will be in a state of chronic inflammation. The cells which are under continual pressure are atrophied; the cells which are continually being irritated are hypertrophied and nodular and finally may take on bony changes. The joint is fixed in a certain position; adhesions take place in the joint proper; there is an increase of fibrous tissue in the structures surrounding the joints and connected with the use of the joint; the relaxed structures become shortened, the strained or tautened ones over-stretched. The joint loses its stability from over-stretching of its capsule and weakening of its supports. If active movements are performed, the joint is used mechanically incorrectly, further inflammation and a vicious circle being set up;

passive movements, if performed incorrectly, do the same thing; even if performed correctly, they may set up inflammation. Complete rest will only produce denser adhesions and at the best can only bring the condition under the heading of Group III. So all three forces used separately cannot cure the condition of the joint. The only way to bring about cure is to use all three forces at the same time correctly: rest to relieve inflammation, passive movement to restore the joint so that it is capable of performing its function, active movements to consolidate each step in treatment and, finally, for the correct performance of that function, all three factors assisting Nature to repair damaged structures.

The amount of rest required is estimated by the amount of inflammation present; an accurate estimate can be made. The symptom which must be watched carefully is increase of synovial fluid; until that has completely subsided the joint should be used very little actively, especially in weight-bearing. To reduce the amount of fluid I always use pressure, first with wool, then with strapping. The increase in fluid tends to recur, and if this happens the only thing is to continue to apply pressure until the fluid finally subsides.

Passive movement can be applied in three ways: (i) continually, by means of an appliance of which I have little experience (but that experience teaches the irresistible force of continual pressure); (ii) forcibly, at one or two sittings, to break down obstructions; (iii) daily or at frequent intervals gradually to break them down.

It is well to be absolutely clear in your objective and to know exactly what takes place. Methods (ii) and (iii) produce trauma and both set up traumatic inflammation; if trauma is extensive owing to tearing of structures, the inflammation will be in the same ratio, necessitating complete rest, healing of the torn and damaged structures, and dense adhesions. If the trauma set up by daily movements is sufficient to stretch and tear the impeding structures without setting up more inflammation than the joint can deal with, then it will assist repair. The sole guide in performing movements is the sense of touch; the amount of movement performed daily must be judged by the patient's endurance and by experience. All movements must be performed steadily, evenly, and on no account jerkily; all movements should embrace the full movements of the joint. Active movements should be made in the same way—slowly, evenly and in the full range—at first one movement in each direction assisted, then unaided, gradually working up to three or four once or twice a day. I seldom order more, even when the joint has attained its full function. Finally, counter movements are given.

The great difficulty and disappointment in joint work are when the patient undertakes his own treatment. The joint may be progressing favourably and the patient obeying instructions; a certain amount of inflammation lights up again, which, if treated, would quickly subside, but if it is not correctly treated the joint will go right back again. I always insist on my patients writing to me immediately if they are not satisfied with their progress.

I should very much like to hear an expression of opinion on the repair of cartilage cells. From my own experience, which is purely clinical, I am convinced that in the joints which progress favourably the cartilage cells become repaired, even in the knee joint, though it may be a slow process.

Group III.

The physical signs in Group III are limitation of movement and usually a general enlargement of the joint, but without signs of inflammation. The treatment consists of passive movements, active movements and reeducation, carrying out the same treatment as has already been described. The treatment of this group may cause much weariness of the soul. The general treatment of all three groups lies in an attempt to replace fear and pain by courage and rest, pessimism by optimism, self-pity and the habit of thinking inwards by an effort to overcome difficulties and think outwards. Success requires all the qualities obtained by years of training; in other words, a proper coordination of the brain and ductless glands.

Spinal Lesions.

In all spinal work it is essential to remember the normal curves of the spine. With the body at rest in the erect position, the head should be held straight up, the chin slightly drawn in, chest out, abdomen in, hips straight, knees straight and touching, feet straight and touching. In that position the diaphragm is taut, supporting the thoracic viscera and allowing full expansion of the lungs; it also lifts up the upper abdominal viscera. The lower viscera are supported by the inclined plane of the lower curve of the spine.

There are roughly two types of individuals who are liable to lose their spinal curves: the fat type, which usually has a bending forward, and the weak type, which usually has a bending backward. In both types the curves are incorrect, causing strain on the muscles and ligaments, alteration of pressure on the intervertebral disks and articular cartilages. Both types are therefore liable to suffer from backache, and because the spinal column is used incorrectly they are liable to suffer from arthritic conditions. It is essential to make a definite diagnosis, and the spine is the one part of the body where use of X rays is necessary if there is any doubt.

The movements are flexion or bending forwards, extension or bending backwards, lateral flexion with rotation, and rotation.

Diagnosis.

As I have already pointed out, most patients with spondylitis stand incorrectly and show alteration in their normal curves. Percussion over the tip of the spinous process and deep pressure of the thumb at the side of the spine produce pain. If there is any nerve involvement due to root pressure, the

patient usually complains of girdle pain and has a definite area of hyperæsthesia. Full movement in one or more directions produces pain.

Treatment.

In the acute cases rest in bed is essential, combined with local support. In the cervical region support is very satisfactorily given by a thick collar of wool extending down the back to the lower edge of the scapula, and a firm bandage applied as a figure of eight round the neck and under both axillæ. If necessary this can be stiffened with a light, malleable splint, the upper part being fixed with a band round the forehead. I find firm strapping most valuable for the other parts of the spine, especially the lumbar region.

I am certain that most patients with so-called lumbago are suffering from arthritis of the sacro-iliac and lumbo-sacral joints, chiefly the former. Percussion and deep pressure over the lumbar spine and lumbar muscles produce no pain; the same percussion and pressure over one of the above-mentioned joints cause pain immediately.

I always use one of the zinc oxide plasters for all work. Take a three-inch width of strapping place one end along a vertical line running through the mid-axillary line opposite the region of the part needing support. Get an assistant to hold the end firmly and tell the patient to stand firmly; take hold of the other end of the strapping with your right hand, pull with all your force straight around the body; press the skin of the other side of the body towards the middle line; with your left hand stick the end down in the same vertical mid-axillary line on the opposite side of the body. Continue strapping as high as needed and then pin a binder tightly round the body.

Do not remove old strapping, but re-strap over it as often as needed. As soon as the signs of inflammation have subsided to a safe stage, order exercises bringing out full mobility of the spine. Chronic cases on the whole give satisfactory results. In the cervical region the head is usually in a position of anterior flexion or lateral flexion. Grasp the head firmly with both hands, gently bend it forwards, backwards, on to each shoulder, and twist the chin fully, first one side and then the other. It is needless to say that rough handling would be disastrous.

The limited number of patients I have treated have responded well to this treatment. If other parts of the spine are affected, lay the patient on his back across a narrow bed, the crease of the buttock touching the edge; take both hands and assist the patient in bending forwards, backwards and in lateral rotation. The next step, the patient being in the same position, is to bend the knees, press firmly on the patient's thighs and make him do the same movements unaided. Next, grasp both ankles, raise both legs straight as far as possible, then lift the buttocks so as to get full bending of the spine. The same movements are given for stiff hip joints, so when dealing with hip joints I shall not repeat them.

If the spine requires straightening and restoration of its curves to normal, counter pressure must be applied to the area concerned. This can be applied during the exercises by means of a horse-hair bolster or firm cushion; on no account should anything solid or unresisting be used. The amount of counter pressure may be increased as needed.

Pressure can also be applied with the flat of the hand or the flat of the shin; both require a good deal of practice. Have the patient sitting half way down the bed, recline on the bed at his back, place the flat of the hand or front of your leg across the affected area needed, let the patient slowly lean backwards, exerting all the pressure he can; you resist, gradually giving way; be ready to relax your pressure immediately if too much pain is produced or if you think enough has been done. It is not safe to rest your own elbow on the bed, as, first, you may not be able to relax your pressure quickly enough and, secondly, you are very liable to injure your wrist. The same two dangers may occur with the use of your leg; it requires more practice.

In sacro-iliac affections order hip joint exercises as well as spinal. The most satisfactory ones are as follow: Place the right foot well forward, the right hand straight above the head, bend forward until the hand touches the toes, balance on the toes, then swing the hand upwards and as far backwards as possible, allowing the back to be arched as fully as possible, dropping back on the heels, first on one foot, then on the other. Squat on the heels and spring quickly up to attention. Stand straight with the feet slightly apart, place the hands straight above the head and arch the back to its full extent; swing forward, touching the toes, keeping the knees straight.

The Lower Extremities.

The functions of the lower extremities are to bear the weight of the body and subserve locomotion; the function of the hip joints is to allow flexion of the body on the thighs and of the thighs on the body. The functions are carried out by means of three main fulcrums and a system of levers.

The centre of gravity in the body in the erect and correct position, which I have already given, falls through the centre of the hip joints and slightly to the inner side of the knee joints and through the centre of the triangle of the foot, where it is resisted by the *os calcis* and the heads of the metatarsal bones of the great and small toes. If the centre of gravity falls incorrectly in one fulcrum, all the others and the whole system of levers will be affected.

The two most common positions for the leg to assume in hip joint affections are: (i) Flexion and inversion, internal rotation and adduction due to spasm of the muscles set up by arthritis. If the limb is used in this position the knee must be bent, and the centre of gravity falling through the outer side of the knee joint will drive the head of the femur inwards. To overcome the shortening the

foot must be raised on the toes, the centre of gravity, resisted by the heads of the metatarsal bones, producing hyperextension of the toes and *pes cavus*. The downward thrust of the body and the upward thrust of the foot will twist the head of the tibia outwards, the *os calcis*, and finally the whole foot, twisting on the toes. (ii) Eversion, abduction and external rotation, due to the weight of the limb and gravity, chiefly occur in injuries to the hip joint and osteo-arthritis. Eversion is not such a serious fault; there is no apparent shortening, the centre of gravity falls to the inner side of the knee, causing strain of the supports and through the inner side of the triangle of the foot, causing flat foot.

There are two types of walking, the exaggerated normal and the normal. In the exaggerated normal the body is in one straight line, the left foot leading and advanced to its full extent, the pelvis, left shoulder and hand and chin all pointing forward and in one line, the right hand pointing backwards, the right foot back as far as possible and pointing forwards; the body is raised on the toes of the right foot, the left foot remains stationary, and the whole swings forwards to assume the same position, the right foot and hand leading; the forward thrust is given by the toes, chiefly by the great toe. Normal walking is a modification of this; I will explain it in discussing the foot.

Treatment of Arthritis of the Hip Joint.

The treatment of the hip joint is not only most difficult, but is liable to be unsatisfactory; the hip joint requires long personal treatment.

It is essential to treat not only arthritic conditions, but injuries in and around the joint, as most serious, to treat them correctly by a combination of rest with passive and active movements. Very satisfactory rest can be obtained by wool pressure and a spica bandage, the lower extremity then being tied to a bolster or sandbag, which extends from the axilla to below the foot, another one extending below the foot on the inner side. Of course, if necessary, a splint can be applied. The movements of the hip are: flexion with extension of the legs as far as possible, then flexion of the knee, bringing the thigh on to the abdomen, full extension backwards, adduction, abduction, internal and external rotation. These movements can be given with a flexed knee by grasping the thigh with both hands or by holding the heel with the right hand, the knee with the left. By the latter method great leverage is obtained and more muscular resistance has to be overcome; therefore it requires more care, but saves effort on the part of the manipulator. The amount of force required is very variable, depending chiefly on which group the joint is in. Group I requires very gentle movement; Group II and osteo-arthritic conditions require a little more force, but still must be very gently treated. Group III may require a great amount of force. When ordering active movements, explain how they are performed, both in the erect position, balancing on one leg, and reclining; in the reclining position all movements should be aided until the patient has complete control. I rely greatly on exaggerated walking exercises; they are given by grasping both the patient's hands, pulling forward the hand of the same side as the advanced foot, pushing backwards the other hand and shoulder, keeping the advanced foot straight and not allowing it to pivot when the posterior foot is brought forward. It is essential to get as long a stride as possible.

Treatment of Arthritis of the Knee Joint.

The knee joint is one of the joints most commonly affected, and its treatment is essentially difficult; unless it has been specially treated it is always in a position of flexion.

Robert Jones, in his "Orthopædic Surgery", writes:

> It has two movements, an anterior-posterior hinge-like movement and also rotation of the tibia upon the femur. In the movement of extension the condyles move parallel to one another, both gliding and rolling till extension is nearly completed. When the anterior part of the rolling surface of the external condyle has already come into full contact with the tibia, the femur, when the tibia is fixed, rotates inwards on the latter and extension is complete. In no position of the knee is lateral movement allowed. The stability of the knee depends on the integrity of the capsule of the joint and its reinforcements, the anterior and posterior crucial and the lateral ligaments, and also on the muscles acting on the joint through their aponeurotic expansions. In semi-flexion a certain amount of rotation both inwards and outwards is possible, external rotation being comparatively free.

The treatment of Group I and of the early stages of Group II is quite satisfactory. It is of special importance to allow no weight-bearing until all signs of inflammation have disappeared; to obtain full mobility, which must be tested by the opposite joint; to strengthen the supports by active movements and to insist upon correct standing and correct walking. When ordering exercises give plain instructions that flexion and extension should be performed slowly, deliberately and no on account jerkily; the knee, in half flexion, should then be rotated externally and internally very gently. If the joint relapses and swells again, it is probably due to one of two causes: (i) An adhesion limiting full mobility, in which case there will be deficiency in the full range of movement. (This can be easily cured by suddenly and firmly bending the joint to its fullest capacity and so tearing the adhesion, the patient immediately afterwards performing the same movement.) (iii) Recurrence of inflammation. (In this instance the same treatment must be carried out as for an acute case.)

Frequently, especially in women at the menopause, a certain amount of creaking remains, even though the joint has its full function; this can be ignored.

The subacute cases (Group II) for descriptive purposes may be divided into two classes:

1. The first class includes those patients with limitation of movement and a generally enlarged joint, but without any increase of synovial fluid. They tend to do well and are not difficult to treat;

they may or may not need local support. Each case must be judged on its merits; if there is much general enlargement, pressure greatly assists in its absorption. Passive movement followed by active movement should be carried out daily. It is safer to have the patient reclining on a soft couch. With the right or left hand, according to the leg concerned, grasp the heel and foot firmly, pull down and lift, using as much force as required. With the right hand placed above the patella press straight backwards and gradually straighten. If a lot of force is required and you have the confidence of experience, it saves energy to press down with your chest; if this is done the back of the knee should be supported with the right hand. Flex the thigh, press the knee against your own body and straighten with the left hand, which is in the same position, the right supporting the back of the knee as before.

Counter movements are then given, exerting only as much force as the patient can overcome. The patient should be taught weight-bearing and balancing as well as correct standing and walking. These exercises are allowed gradually, at first assisted and, as the joint regains its function, unassisted. The exercises should include bending and squatting exercises. Watch most carefully for any sign of recurrence of inflammation.

2. The second class includes those patients with a chronic increase of synovial fluid, thickened and chronically inflamed cartilage, thickened in front of the joint and atrophied behind; if the bones are affected they are in the same condition. The structures surrounding the joint are unable to give stability to the joint, being thickened and shortened posteriorly and stretched laterally and anteriorly. The leg is rotated outwards, the joint flexed, the foot in the position already described. The condition fills one's heart with despair and at times with a bitterness that such things should be.

In both classes first test the mobility of the patella; if it is fixed, then passive and active movements are useless. Fortunately, if it is not permanently fixed, it is fairly easy to obtain mobility. Grasp the patella firmly between the thumb and index finger, slide it up and down and from side to side.

These patients can be treated only by a combination of rest with passive and active movement, so used that one assists the other in the process of repair.

The treatment is the same as for the previous class, except that we are now dealing with a more advanced condition and excess of synovial fluid, which is the great problem; the joint absolutely cannot recover while it is present. Though the joint may gradually progress under treatment, any treatment is doomed to failure unless the fluid is got rid of and the joint kept free. Pressure will remove the fluid, but it tends to recur, at first generally, then in pouches. I use wool pressure and then strapping. The difficulty of strapping is that it sets up irritation of the skin after a time.

The principle of strapping is the same in all joints, with slight modifications, so I shall describe it only for the knee. Use strapping of one and a half inches width. Lay one end without tension a little to the outer side of the mid-line at the back of the joint and hold the end with the tip of the index finger; with the side of the index finger hold the strapping at the side of the knee firmly so that it cannot slip. With the right hand pull the strapping firmly, exerting as much pressure as is safe across the front of the joint to the opposite side; still keeping up pressure, hold it firmly on the side of the knee with the right thumb, drop the end, exerting no pressure, across the back of the knee and stick it with the index finger, finishing as starting. Strap the whole joint in the same manner. Restrap as often as is necessary, but do not remove old strapping. Rotation outwards is corrected by daily twisting the leg back again into position. Full mobility can usually be obtained and in time the synovial fluid ceases to recur. Still all patients complain of instability of the joint and pain on weight-bearing.

The treatment of type (iii) is based on what has already been given; it varies from snapping a few adhesions to months and months of gradually stretching the structures which prevent function.

The Foot and Upper Extremity.

Coming to the treatment of the foot and upper extremity is like turning from darkness into light; they respond to treatment. The foot and hand are of exquisite workmanship.

The Foot.

The functions of the foot are: weight-bearing during standing and locomotion; the provision of a spring to resist jars and assist propulsion during movement; and action as a pivot to assist in turning of the body.

Time does not allow me to describe the minute anatomy of the foot; I shall go through only what is essential. The foot is a triangle; the outer side and the base are composed of bones, the inner side of ligaments and tendons, the chief of which are the invertors of the foot, the two tibials; the points of the triangle are the *os calcis* and the heads of the metatarsal bones of the great and small toes.

When a person is standing with a straight foot the centre of gravity falls through the centre of the ankle joint and through the centre of the triangle; weight is resisted by the three points of the triangle, all bone; no weight is taken by the arch. If the foot is everted, the centre of gravity falls to the inner side of the triangle and weight is resisted by ligaments and tendons.

So, correct standing is with a straight foot, the two feet together forming the dome of an arch. When walking the forward foot lands on the heel and then falls flat, the hind part of the back foot is raised by the flexors of the leg, the weight is taken by the heads of the metatarsal bones, and the thrust forward is given by the extended toes, chiefly

the big toe. Correct walking is, therefore, heel, centre of the foot, toes. The joints connected with the foot are: the ankle joint, which is almost a pure hinge joint, allowing flexion and extension; the sub-astragaloid joint, the joint between the astragalus and *os calcis*, allowing inversion and eversion of the heel (this joint is chiefly used in balancing the body). The mid-tarsal joints are formed between the *os calcis* and cuboid, the astragalus and scaphoid, and between the scaphoid and cuneiform bones; they give elasticity to the foot and stop jarring, and they allow a certain amount of abduction and adduction of the front and back of the foot, some rotation at the astragaloid joints, and a certain amount of flexion. The metatarso-tarsal and the highly important metatarso-phalangeal joints and interphalangeal joints all allow flexion and extension. I do not see how it is possible to treat feet properly without this knowledge.

In primary affections of the foot the two common conditions are: (i) a general affection of the ankle joint and all the joints of the foot, the foot being in the extended position, abducted and flat; there is usually an increase of synovial fluid in the ankle joint and the foot is generally enlarged and tender; and (ii) an affection of the metatarsal joints; this is frequently combined with tenderness over the heel and teno-synovitis of the *tendo Achillis*.

In secondary affections I have already given the positions.

Treatment.

Put the foot at rest with wool pressure and when applying the bandage pull the foot into a position of full flexion and inversion. Fortunately the synovial fluid fairly rapidly clears up and does not tend to recur. Mould the foot back again into position; with the left hand grasp the leg round the malleoli, with the right hand flex and extend the whole foot, keep the hand in the same position and rock the heel into inversion and eversion. Move the left hand just below the malleoli; with the right hand grasp the foot round the heads of the metartarsal bones, abduct, adduct, invert, evert, flex and extend the foot at the mid-tarsal joints. Hold the foot firmly around the heads of the metatarsal bones, with the flats of the fingers of the right hand, flex and extend the toes.

When the foot has arrived at the stage when most of the swelling has gone and fair mobility has been obtained, then pull up the arch. I have found the following method quite satisfactory. Two assistants are needed. Take a three-inch width of strapping, lay one end along the outer side of the leg about the junction of the upper and middle thirds; the first assistant holds it firmly down so that it will not slip; the second assistant flexes and inverts the foot to its fullest capacity, maintaining that position during the whole period of strapping. Pull the strapping down, bring it round the sole of the foot and upwards on the inner side, finishing opposite the other end, using full force during the whole movement. The first assistant holds both ends down firmly. Place four or five strappings of about one and a half inches width at comfortable tension (on no account should there be any constriction), two round the foot in a figure of eight with the pull in inversion, one or two round the ankle to fix the tautened strapping to the leg, and a circular strap around the leg to hold the top of the strapping, nick the edge of the strapping which is pressing on the heel so that it is comfortable, bandage in inversion and stitch the bandage. Restrap over the old strapping when necessary, usually once a week; keep on strapping as long as required, usually four to six weeks or longer. Raise the inner side of the boot and heel by about a third of an inch. Do not allow any weight-bearing without the wearing of a boot. It is a general rule to put a bar on the inner side to support the waist of the boot; if the bar does not interfere with mobility, it does good; if it does, I think it wrong in principle. Correct walking and standing are taught most carefully; this is essential; tip-toe and other exercises are given.

Affections of the metatarso-phalangeal joints are most common, most crippling and quite easy to treat; of course, the modern woman's high-heeled shoe asks for trouble.

The diagnosis is quite simple: there is a swelling over the joints, chiefly the second, and tenderness on pressure. The foot should at first be put completely at rest with wool pressure; if there is a combination of tenderness over the heel it is all embraced. Owing to the presence of the little toe it is difficult to apply pressure over the front of the foot. This is followed by strapping. Strapping is most satisfactory. Commence as low down as possible, just clearing the toes, lift well up the heads of the bones with each strap, continue up as far as needed, put on two thicknesses of strapping and restrap as often as required. I have not found a bar on the boot across the heads of the metatarsal bones satisfactory. Secondary joint conditions are treated in the same way.

The Upper Extremity.

I shall very briefly deal with the upper extremity, as I am afraid I am wearying you.

The function of the upper extremity is the numerous uses to which it is put. The movements of the wrist joint are: flexion, extension, abduction, adduction and circumduction of the lower radio-ulnar joint, pronation and supination.

The treatment of an acute infection of the two above-mentioned joints and the other joints making up the hand is by wool pressure, using the whole width of a pound packet of wool, which extends to the elbow joint. Pull the hand into full extension and supination; the fingers can be either left free or included as needed.

In the subacute stage of infection the hand is in a position of flexion, adduction and pronation; there is usually an increase of synovial fluid in the wrist joint and in the lower radio-ulnar joint, which in chronic cases is nearly always affected, and there is marked relaxation of the capsule and supports, a general thickening over carpal and metacarpo-carpal

joints, as well as an increase of synovial fluid in all or some of the metacarpo-phalangeal and phalangeal joints; the middle finger is usually the worst.

Limitation of movement is in all directions.

In treatment general principles must be observed. Strapping is quite satisfactory when the appropriate stage is reached and it can be applied to all joints, including fingers, provided that the principles of applying strapping are adhered to.

When moving fingers, make a splint with your finger and alternately flex and extend between them. In dealing with the metacarpo-phalangeal joints, hold the joint between the thumb and index finger of your left hand, grasp the whole finger with your whole right hand and flex and extend.

The carpo-metacarpal joints are moved by holding carpal bones with the left thumb and index finger, the head of the metacarpal bone by the right thumb and index finger, which is flexed and extended. The carpal bones are individually loosened with thumb and index finger, the hand crushed together and opened. The wrist joint and lower radio-ulnar joint are given their full mobility, the left hand being used to guard.

The Elbow Joint.

The elbow joint is purely a hinge joint and allows flexion and extension; the superior radio-ulnar joint is a pivot joint and allows pronation and supination. As the synovial membrane is continuous with the elbow joint, both joints are affected at the same time.

Treatment.—In the acute stage the joint is put at rest at a little more than a right angle.

In the subacute stages, if there is an increase of synovial fluid, it can be seen at both sides of the olecranon and over the head of the radius. It is most difficult to reduce, because it is practically impossible to apply pressure; at least, I have found it so.

Limitation of movement is in flexion and extension. I have found it extremely difficult to get full extension, even though the joint has otherwise recovered. Limitation of flexion is usually not marked, and it is not difficult to obtain the full movement.

The treatment of the upper radio-ulnar joint requires a lot of patience. The movements are performed by supporting the elbow with the left hand, the thumb and index finger firmly grasping the head of the radius, the right hand holding the lower ends of the radius and ulna and upper part of the hand pronates and supinates.

When flexing and extending the elbow joint, always support the joint with the left hand, cupping the back of the joint during extension and holding it firmly during flexion, with the thumb across the front of the joint. It greatly tends to safety when extending if you keep your chest just touching the back of the forearm during the whole procedure.

The Shoulder Joint.

Shoulder joints are not difficult to treat, though they are extremely painful. In the acute stage the arm is in a position of adduction, slight flexion and internal rotation. The joint can be put at rest quite well by folding the ordinary width of a pound packet of wool three or four times, laying it over the centre of the shoulder, extending from the neck almost to the elbow joint, folding a full width and padding out the axilla and then bandaging round the shoulder and round the body. Fix the arm across the body and sling the hand just under the chin. As there should be no question of ankylosis, there is no need to use an abduction splint.

It is essential to obtain full mobility. If mobility is not fully obtained, a few adhesions may be left, which are most painful; and because pain is produced the arm will be kept at rest and then definite limitation will be produced. It is quite simple to break down these adhesions.

The movements I always give are: Swing the arm with straight elbow joint in a circle, keeping close into the side and allowing it to fall straight backwards without any abduction. Swing the arm with a straight elbow in a circle, keeping close into the front of the chest. Abduct the arm to a right angle and bring it backwards as far as possible; drop arm in the same position until it touches the opposite buttock. Swing the arm back to its original position, continue to swing over the head, flex the elbow, touch the point of the opposite shoulder, carry the fingers just below the root of the neck to the same shoulder, and recover in full abduction. Rotate the arm.

In the subacute stages there is usually a marked limitation of movements which necessitates lifting the arm. Manipulation is given in the usual manner. If the scapula is fixed (this does not often occur), then it must be held whilst the manipulative movements are taking place.

CONCLUSION.

I quite recognize that, working alone in the country on a comparatively small number of cases, it is very easy to arrive at wrong conclusions, especially if these are checked purely by clinical observations. For all that I am convinced that my conclusions are right, and right will conquer, though it may have to sleep to wake.

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(3) Robert Jones: "Orthopedic Surgery", Volume I.

THE INVESTIGATION OF THE TOXICITY AND STERILITY OF A COMMERCIAL PREPARATION CONTAINING MODIFIED SNAKE VENOM.

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AND

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THREE samples of a commercial preparation of snake venom for the treatment of epilepsy were

recently submitted to us for examination by Dr. H. F. Maudsley, Honorary Psychiatrist at the Melbourne Hospital.

Though the preparation contained sufficient phenol to kill other than non-sporing organisms, viable spores were present in it, which were of some interest, since they were probably present in the venom used for manufacture.

We communicated our results to the makers, who have adopted our suggestions for insuring and maintaining the sterility of their product.

CHEMICAL EXAMINATION.

Since the composition of the remedy is not stated in the literature describing it, it was thought advisable to subject it to a few simple chemical tests. These were carried out by our colleague, Miss Mavis Freeman, B.Sc., upon a small sample withdrawn with full aseptic precautions from one of the three bottles available for investigation.

The preparation was found to have a dry weight of 1·2 milligrammes per cubic centimetre and a total nitrogen content, by micro-Kjeldahl, of 0·075 milligramme per cubic centimetre, corresponding in all probability to a content of dry venom or venoms of about 0·5 milligramme per cubic centimetre. It contained phenol and about 10% of glycol or glycerine. No formalin was present.

PHARMACOLOGICAL TESTS.

Since the material was shown to be contaminated, it was not thought worth while to carry out any extensive pharmacological investigations. A few tests were made by intravenous injection into wild rabbits, which indicated the presence of "thrombin". Further, the shock-like condition produced by intravenous injection (even if thrombosis were avoided) suggested that some of the venom present was viperine. The results of these experiments are summarized in Table I.

As was suggested by the emphatic warning in the printed instructions accompanying the remedy, never to administer it intravenously, traces of active "thrombin" were evidently present, though apparently some means had been used (heat or prolonged contact with phenol) to remove most of the thrombin of the crude venom or venoms.

To ascertain whether the fall of blood pressure and the shock-like *post mortem* picture observed in the second experiment of Table I was due to intracardiac thrombosis or to constituents of viperine venoms which, as Essex and Markowitz[1] have shown, have a powerful peripheral action on the vessels, a further experiment was made in which the material was given in two doses, the first too small to cause thrombosis, so that the animal was protected from the coagulant action of a second dose by the negative phase produced by the first.

The progressive fall of blood pressure produced by the two injections is seen in Figure I. *Post mortem* no intravascular thrombosis was found and the typical shock-like picture was observed.

TABLE I.

Results of Intravenous Injection in Wild Rabbits.

Weight of Rabbit in Kilograms.	Dose in Cubic Centimetres.	Results.
1·3	1·5	Slight symptoms — dyspnœa and general weakness. Recovery in a few minutes. Survived.
1·9	2·0	Under ether anæsthesia injection caused a fall of blood pressure from 70 millimetres of mercury to 34. Death took place in one hour forty-one minutes, with final fall of blood pressure from 28 millimetres of mercury almost to zero, and convulsions. *Post mortem* there were extensive hæmorrhages throughout the myocardium and petechial hæmorrhages in the lungs, mesentery and pancreas. There was an *ante mortem* clot in the heart, and the blood, which was fluid in the vessels, did not clot in three and a quarter hours. The appearances otherwise resembled those found in histamine shock, the skeletal muscles, small bowel and pancreas being intensely congested.
1·4	4·5	The immediate symptoms—dyspnœa and general weakness — were recovered from in ten minutes, but death with failure of respiration and convulsions occurred in thirty-nine minutes. *Post mortem* the heart was found to be still beating when the respirations had ceased, and the appearances resembled those of portal thrombosis with intense engorgement of the spleen and small intestines. The urine was stained with blood. No gross clotting was present in the large vessels and the blood remained fluid for many hours after death.

It seemed probable, then, that if the presence of toxin due to anaerobic organisms could be excluded, this result pointed to the presence of a viperine venom in the preparation.

BACTERIOLOGICAL EXAMINATION.

The three bottles containing the samples V_1, V_2 and V_3 were received, V_1 on September 2, 1932, and V_2 and V_3 on September 14, 1932. They were opened with aseptic precautions and the contents of each (twenty cubic centimetres) were pipetted into a series of sterile test tubes.

The technique of the examination may be best described by detailing the results of the examination of V_1.

1. Direct smears were made and fixed by drying overnight in the incubator and subsequent treatment with alcohol. They showed only a few Gram-negative cocci and bacilli.

2. The following media were inoculated with the fluid: nutrient broth and agar, glucose broth and agar, blood agar, brain and meat media. No growth occurred aerobically, except in the brain and meat media. After eighteen hours' incubation these had become faintly pink with the production of some gas, and had acquired an unpleasant odour. Films of these cultures showed slender Gram-positive bacilli, many of which had terminal oval spores. Some of the spores retained the Gram stain, giving the organisms a bulb-like appearance. There

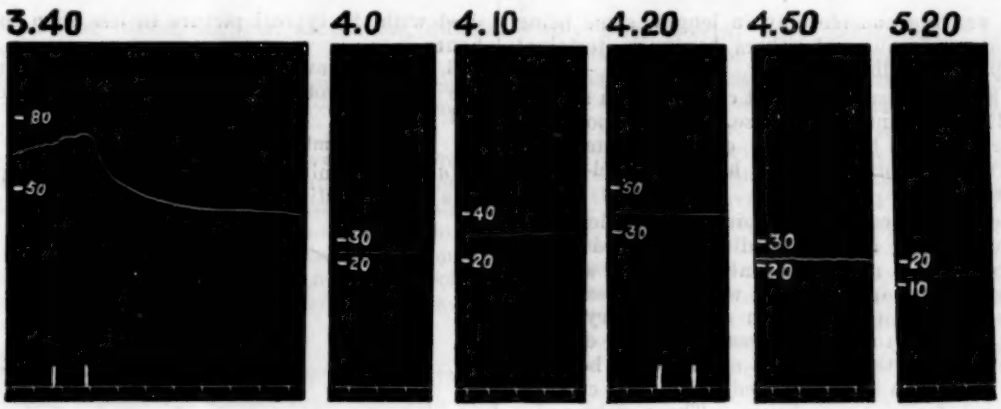

FIGURE I.
Blood pressure tracing from a rabbit weighing 1·6 kilograms, which received, at 3.41 p.m. and 4.21 p.m., 1·0 cubic centimetre of the preparations intravenously. Time in half minutes.

were also a few free spores, which at first were thought to belong to the slender bacilli.

3. From these cultures blood agar and nutrient agar plates were inoculated and put up aerobically and anaerobically. Growth occurred under anaerobic conditions only. On blood agar, after forty-eight hours, moist spreading greyish-looking colonies with outrunners were to be found. These were composed of slender Gram-positive bacilli with a few terminal spores, but thicker, shorter bacilli were also present (Figure II). Growth was feebler on nutrient agar plates. The colonies were moist and slightly opaque, growing in a continuous mass along the first line of inoculation, with a tendency to spread laterally. The appearance of films from these colonies was identical with that of the growth on blood agar.

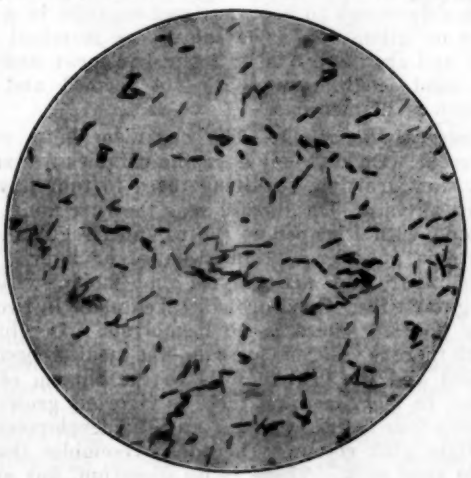

FIGURE II.
Slender bacilli, showing a few terminal spores, also a larger and thicker bacillus (*Vibrion septique*). Eighteen-hour culture. (Gram ×1,000.)

4. The subcutaneous injection of 1·0 cubic centimetre of a forty-eight hour anaerobic broth subculture from one of these colonies into a guinea-pig of 250 grammes caused death in less than twenty-four hours. *Post mortem* there was extensive hæmorrhagic œdema and much gas in the subcutaneous tissues, spreading from the region of injection, but no gross internal lesions were found. Culture of the heart blood into meat medium gave vigorous growth in eighteen hours with much gas formation and a vivid pink colour. Films showed numerous short Gram-positive bacilli, some having central, subterminal or terminal spores, and a few filamentous types. Slender bacilli with an occasional terminal spore were also present (Figure III).

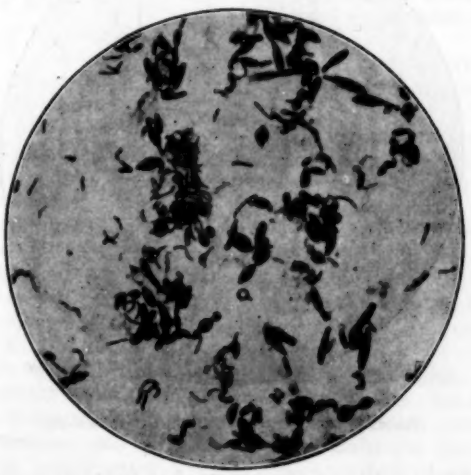

FIGURE III.
Slender bacilli and *Vibrion septique*, showing citron and club-shaped forms. Eighteen-hour culture. (Gram ×1,000.)

5. Separation of the two organisms present was done by repeated plating out on glucose agar and passage through guinea-pigs. Two different types of colony were now obtained:

(*a*) Moist, round, opaque colonies with a heaped-up centre and irregular edge, composed of slender

bacilli varying considerably in length, some being filamentous forms and others having a terminal oval spore or bulb.

(*b*) Slightly opaque and flat colonies with rapidly spreading outrunners. These were composed of thicker, shorter bacilli with central, subterminal or terminal spores. Some had a barrel-shaped appearance.

Repeated subculture by picking colonies gave (*a*) pure. This in meat medium produced gas, a pink colour and an unpleasant odour. It was not pathogenic for animals. It was only possible to obtain (*b*) quite free from (*a*) by very often repeated subculture and passage. Three colonies were at last obtained which appeared to be pure. These were sown into meat medium and the cultures incubated for eighteen hours. Three guinea-pigs were given intramuscular injections of 0·5, 1·0 and 2·0 cubic centimetres respectively of these cultures, numbers 13, 14 and 16. All died in less than fourteen hours, with pronounced swelling of the tissues of the thigh at the site of injection and blood-stained œdema extending up into the corresponding axilla. There was much gas in the areolar tissues. The muscles were bright red in colour, but there was no softening or putrid odour. Smears of the œdema and peritoneal fluids and of the liver and spleen showed very numerous Gram-positive filamentous chains of bacilli (Figure IV).

FIGURE IV.
Smear from peritoneal fluid of guinea-pig. (Gram × 1,000.)

Cultures 13 and 16 were used in protection experiments with Parke, Davis and Company's mixed antitoxin containing one hundred units of *perfringens* and one hundred units of *Vibrion septique* antitoxin. Guinea-pigs weighing 250 grammes received one and two cubic centimetres of antitoxin intraperitoneally and 0·5 cubic centimetre of meat broth culture intramuscularly. Both survived without symptoms, but controls which received 0·5 cubic centimetre of the same cultures without protection, died with the typical picture in less than fourteen hours.

6. Further investigation for the identification of the two anaerobic organisms present was carried out.

Terminal Oval Sporing Bacillus.

(*a*) The terminal oval sporing bacillus (Figure V) was first investigated.

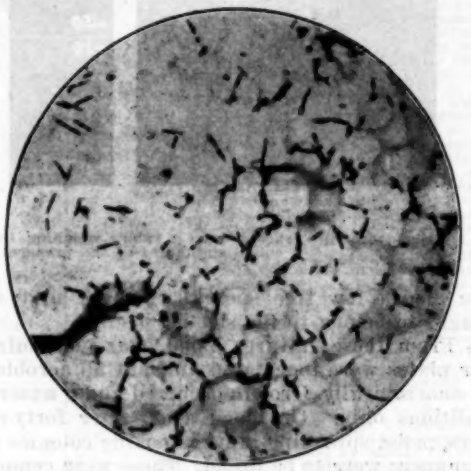

FIGURE V.
Smear from a pure eighteen-hour culture in meat medium of an organism resembling *Bacillus cochlearius*, showing a few spores.

Morphology.—The bacilli were Gram-positive, sluggishly motile, slender rods of variable lengths with a tendency to become Gram-negative in a few days on all media. The spores are terminal and oval and are more readily formed in meat medium. On solid media spores are not formed and the growth is filamentous.

Cultural Reactions.—The organism is a strict anaerobe. On nutrient agar the colonies are small and slow growing, requiring three to four days to reach any size. On glucose agar they are moist and opaque, with a heaped-up centre and irregular edge. There is good growth in twenty-four hours. On blood agar they are greyish and moist, with an irregular edge. Good growth takes place in twenty-four hours. There is no hæmolysis. In glucose broth there is vigorous growth—the medium becomes turbid and the growth falls to the bottom of the tube. In meat medium there is vigorous growth in twenty-four hours, with gas and the development of a slight pink colour. The odour resembles that of stale sour milk. There is no digestion, but slight blackening of the upper layers is observed in old cultures. Milk is clotted and the litmus bleached in four to six days. In blood serum there is no liquefaction or pitting. The growth is moist and the colonies of a creamy colour. Gelatine is liquefied. The growth is rapid and falls to the bottom of the tube.

Sugar Reactions.—The following sugars are not fermented in fourteen days: lactose, mannite, dex-

trose, salicin, inulin, maltose, saccharose, dulcite, galactose and lævulose.

Pathogenicity.—The bacillus is non-pathogenic to guinea-pigs in doses up to three cubic centimetres intramuscularly.

The organism somewhat resembles *Bacillus cochlearius* (Douglas, Fleming and Colebrook[2]). It differs from *Bacillus cochlearius* in coagulating milk and liquefying gelatine, in its sluggish motility, and in the opacity of the colonies on solid media. So far as we can ascertain, no other anaerobe is present to account for these differences of behaviour apart from the sluggish motility.

Rod-Shaped Organism with Subterminal Spores.

(*b*) The thicker rod-shaped organism with subterminal spores (Figure VI) was also investigated.

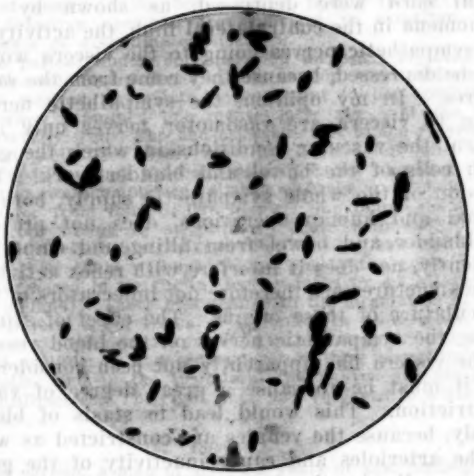

FIGURE VI.
Smear from a pure eighteen-hour culture on blood serum of our strain of *Vibrion septique*.

Morphology.—The organism exhibits considerable variation in different media. In young cultures the organism is a motile Gram-positive bacillus of varying length. The spores are oval and may be central, subterminal or even terminal. They are readily formed on all media. When they are grown on inspissated serum or blood agar, club-shaped, bulbous, or deeply stained citron forms are frequently found. Filamentous types and short chains are more often found in fluid media. Surface smears from the liver or peritoneal fluid of infected guinea-pigs show very long snaky chains and filaments.

Cultural Reactions.—On glucose agar plates the surface colonies are moist and semi-transparent with crenated edges. They have a tendency to form flat or branching outgrowths, which spread rapidly. On blood agar plates growth is prolific, a transparent continuous film covering the whole plate in eighteen hours. There is no hæmolysis. On nutrient agar growth is poor; it is also very feeble in nutrient broth, which becomes slightly turbid only after several days' incubation. Later the growth sinks to the bottom of the tube. In glucose broth growth is vigorous; the organisms sediment after about thirty-six hours' incubation, leaving the fluid almost clear. In meat medium there is a vigorous growth with formation of gas. A bright pink colour is produced. The bacilli gradually sink into the meat, leaving the fluid above quite clear. There is no blackening or digestion and no putrefactive odour. In litmus milk clotting takes place between the third and sixth day. On inspissated serum the organism grows freely. There is no liquefaction or pitting after many days. Gelatine is liquefied; growth is rapid and the organisms sink to the bottom of the tube.

Sugar Reactions.—The following sugars are fermented: glucose, lævulose, maltose, lactose, salicin, and saccharose. The sugars not fermented are galactose, inulin, mannite, and dulcite.

Pathogenicity.—Intramuscular injections of 0·5 cubic centimetre of broth from an eighteen-hour culture in meat, kills guinea-pigs of 250 grammes weight in less than fourteen hours. *Post mortem* there is some swelling at the site of injection, with extensive blood-stained œdema covering the whole abdomen. Gas bubbles are present in the areolar tissue. The muscles affected are deep red in colour. The suprarenal bodies are somewhat congested. There is a small amount of fluid in the peritoneal cavity. No macroscopic changes could be detected in the other organs. Films from the peritoneal fluid and surface of the liver show typical long chains and filamentous bacilli, which are all Gram-positive. Films from the heart blood also show long filaments.

Guinea-pigs are protected by intraperitoneal injections of mixed *Vibrion septique* and *Bacillus welchii* antitoxin.

These characters are identical with those of *Vibrion septique*, *Bacillus œdematis maligni*,[3][4] except that the latter ferments galactose but not saccharose.

All three bottles of the preparation were studied in this way. V_2 yielded *Bacillus subtilis* and an organism identical in all respects with (*a*) just described. In V_3 three organisms were isolated, bacteria identical in all respects with (*a*) and (*b*) of V_1 and *Bacillus subtilis* in addition.

It seemed likely that all these anaerobes were original contaminants of the venom used in manufacture. The makers have probably avoided filtration, and to produce and maintain sterility have relied upon a high concentration of phenol. That this is effective against organisms other than sporers was demonstrated in the following way.

Three samples, two cubic centimetres in volume, were inoculated with a streptococcus, *Staphylococcus aureus* and *Bacillus coli* respectively (one loopful of an eighteen-hour culture), shaken and left at room temperature. Repeated daily subculture showed that streptococci were killed in two days, staphylococci in three days and *Bacillus coli* in four days.

CONCLUSIONS.

Three sporing organisms were isolated from a commercial preparation of modified viperine venom. These were *Bacillus subtilis*, *Vibrion septique* and a bacillus resembling *Bacillus cochlearius*. The probable source of contamination was the venom used for manufacture, though, owing to the manner in which the preparation was put up, subsequent contamination cannot be excluded.

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(2) Douglas, Fleming and Colebrook: Cited in "Report on the Anaerobic Infection of Wounds and the Bacteriological and Serological Problems Arising Therefrom", Medical Research Committee Reports, London, 1919, page 41.
(3) *Ibidem*, page 20.
(4) J. Zeissler: *"Anaërobenzüchtung"*, *Handbuch der Pathogenen-mikro-organismen"*, Volume X, pages 109 and 120.

THE SURGICAL TREATMENT OF DISSEMINATED SCLEROSIS.

By N. D. ROYLE, M.D., Ch.M., F.R.A.C.S.,
Sydney.

IN a previous paper[1] I described the changes in cerebral circulation that follow the removal of the superior thoracic ganglion or the division of the thoracic sympathetic trunk between the first and second thoracic ganglia. The application of this procedure to diseases of the central nervous system was also outlined and I have now to describe the changes that occur in disseminated sclerosis on the application of the same principle of treatment, namely, improvement in the cerebral circulation.

Patients' Histories and the Result of Treatment.

Case I.

The patient, a married woman, aged thirty-nine years, had suffered from loss of power in both lower limbs for seven years. The upper limbs were also affected, but the condition was worse in the left upper and left lower limb than in the right limbs. Retention of urine was difficult and she had frequent micturition. She had to get up three or four times every night to pass urine. She complained of loss of mental concentration and had a poor memory. She did not read because she could not remember the thread of the story. She was chronically constipated and had been all her life. When walking she had to use a stick and she fell to the left. She was always tired and particularly after a good sleep.

On examination she had a scanning speech and an exaggerated jaw jerk. There was no nystagmus and her eyesight was poor in both eyes. Dr. E. A. Brearley, ophthalmic surgeon to the Royal Prince Alfred Hospital and to Lewisham Hospital, reported after the operation had been performed on the right side that the changes in the eye of the left side were such as occur in disseminated sclerosis, that is, there were signs of retrobulbar neuritis, but the right was normal, although the right eye had been the worse before operation. The knee jerks were exaggerated in the phasic response and also in postural tone, as shown by the slow relaxation and absence of oscillations. The Babinski reaction was present on the left side, but the response on the right was plantar-flexor. The patient had bluish sclerotics.

Operation and Result.—The patient underwent operation and a right thoracic sympathetic trunk section was performed on February 25, 1932. The immediate effect on the patient's condition was an improvement in her speech. The scanning was less pronounced. Her memory began to improve in a few days. When she walked three days after operation, it was found that her walking had improved. When seen one month later, she walked without a stick and has continued to do so ever since. She has ceased to fall to the left and walks quite straight. She wakes up refreshed after sleep and can now do her household duties; this was impossible before operation. Her frequency of micturition was relieved to the extent of having to pass urine every four hours and not at all at night. Constipation was completely relieved.

Contralateral Control of Vasomotor Centre.—The lessened activity of the vasomotor centre was shown by a contralateral fall in blood pressure and an improvement in circulation shown by the greater pinkness of the left lower limb when compared with the right. This indicates that the control of the vasomotor centre is contralateral and that its activity is diminished by increasing the cerebral circulation. The diastolic pressure only was altered and was 25 millimetres of mercury lower in the contralateral lower limb. Six months after operation in each limb the systolic pressure was 200 millimetres of mercury and the diastolic was 165 on the ipsilateral limb and 140 in the contralateral.

If the activity of the vasomotor centres of the spinal cord were depressed, as shown by the phenomena in the contralateral limb, the activity of the sympathetic nerves going to the viscera would also be depressed, because they come from the same centres. In my opinion, the sympathetic nerves going to viscera are vasomotor nerves only and control the vascular conditions in which the ganglion cells of the bowel and bladder work. The excision of the whole sympathetic supply, both in animal and human operations, does not prevent the bladder and bowel from filling and emptying efficiently, nor does it interfere with reflex activity; these structures are therefore not innervators of the musculature of these organs. The effect of stimulating the sympathetic nerves on the blood vessels of the viscera has apparently not been considered, but it must be to cause a great degree of vasoconstriction. This would lead to stasis of blood supply, because the venules are constricted as well as the arterioles and cause inactivity of the ganglionic cells in the organs, thus producing the inhibitory effect said to follow stimulation of the sympathetic nerves. The only noticeable effect of cutting the sympathetic nerves going to the viscera in animals is a very slightly increased frequency of evacuation of the bladder and bowel. This indicates the probability that a moderate degree of vasodilatation insuring a good blood supply is the normal state of the vessels of the viscera; moderate vasoconstriction would lead to diarrhœa, as is seen in anxiety states. But it is not so easy to reconcile the relief of constipation and of precipitate and frequent micturition in the same patient on this basis. The former must depend on a peripheral mechanism, while the latter depends on a central nervous reflex.

This patient underwent operation on the left side on August 26, 1932. This led to a further improvement in memory and her bad temper, which had afflicted her family, was cured. The frequency of micturition was completely relieved and the blueness disappeared from her sclerotics. She completely lost her scanning speech.

Case II.

The patient was a woman, aged thirty-three. She complained of loss of power in the lower limbs and frequency of micturition. On examination the lower limbs were wasted and the patient was very thin. She weighed

only 35 kilograms (seventy-eight pounds). She had a loss of balance and when she attempted to walk she fell to the right. She could not walk up and down steps and could not rise from a sitting posture. Her feet were always cold and she was always tired. She complained of poor sight.

The knee jerks were exaggerated in phasic response and relaxation was slow with few oscillations on the left side. There were no oscillations on the right side indicating an increase of postural tone and an involvement of prespinal centres. The Babinski reflex was not present, but there was ankle clonus and a definitely increased ankle jerk both in the phasic and postural response. She was constipated and had frequency of micturition, which bothered her about every ten minutes during the day, but not at night. This frequency at night is usually considered to indicate a functional condition, but one has only to remember the reflex stimulation of micturition following changes in temperature to realize that the constant temperature of a warm bed may be sufficient to inhibit the reflex. Her condition had been stationary for the last two years. In the absence of other signs the character of the knee jerks, loss of balance and loss of power in the lower limbs, falling to the right, and defective eyesight are sufficient to establish the diagnosis of disseminated sclerosis.

The patient underwent operation on April 27, 1932; a left thoracic sympathetic trunk section was performed. There was an immediate improvement in her condition, and when examined one month later she said she felt wonderfully well. She had ceased to fall to the right and walked well. Her eyes, particularly the left one, had improved so much that she discarded her glasses. Constipation was completely relieved and she could hold her urine for from four to five hours. She found she could rise from sitting in an ordinary chair with ease. She could also climb stairs three months later and rise from a low easy chair without holding on to the arms. She has increased in weight in three months by 4·5 kilograms (ten pounds). There is a change in the circulation of the contralateral lower limb. It is pinker in colour than the ipsilateral. Her blood pressure in the contralateral limb is 138 millimetres of mercury, systolic, and 98 millimetres diastolic; and in the ipsilateral the figures are 138 and 103 millimetres. The right knee jerk returned to a normal activity.

Case III.

The patient, a man of sixty-six years of age, complained of loss of power and lameness of his left lower limb for about ten years. He had to walk with two crutches. The condition had become worse during the last twelve to eighteen months. During the last twelve months his hands had been affected with numbness. The patient was very constipated, but the control of his bladder was normal.

On examination he had an exaggerated degree of nystagmus in both eyes and a definitely exaggerated jaw jerk. The knee jerk was exaggerated in phasic response, relaxation was slow, and there were no oscillations on the left side. The right jerk was normal. On the left the plantar reflex was of the Babinski type and on the right the reflex was flexor in type. The left thigh adducted when the right patellar tendon was percussed. Clonus affected the whole left lower limb when the toes were placed on the ground. His speech was slurring and thick.

Operation.—He underwent the operation of thoracic sympathetic trunk section on July 26, 1932. On account of the clinical signs on the left side, this operation was done on the right. There was an immediate improvement in speech and the extent of his nystagmus was lessened. He was able to walk with one stick. In a later report his doctor stated that the abnormal jaw jerk had disappeared and that he was lifting his left foot better than before operation, but that he had still to use support in walking. His constipation was completely relieved.

Case IV.

The patient, a man of fifty-two years, had been unable to stand or walk for about twelve months. He first suffered from loss of power in his lower limbs four years ago. His hands had also been affected with numbness and when he attempted to pick up objects tremor appeared. The latter was worse during excitement. He was very constipated and he had a little difficulty in passing urine. He had trouble with his eyesight, but when examined after operation by an ophthalmic surgeon he did not have signs of retrobulbar neuritis. He was not as bright mentally as he had been and he complained of tightness in his chest and his breathing was difficult.

On examination the patient exhibited a definite jaw jerk and his speech was scanning in character. The knee jerks were exaggerated both in phasic and in postural response. The relaxation was prolonged and the oscillations were absent. The Babinski reflex was present in both lower limbs and he had a slight degree of horizontal nystagmus. He underwent operation on September 7, 1932, when a right thoracic sympathetic trunk section was performed. Four days later he could stand alone and found greater usefulness in his left hand. He could pick up objects with certainty and without tremor. He underwent operation for the left side on September 14 and found a corresponding alteration in the function of the right limbs. He was able to stand alone with confidence. He lost the numbness in his upper limbs. The sister in charge of him said he was much brighter mentally and his relatives noticed the same result. He could walk with very little support, whereas before operation he could walk only by placing his hands on the shoulder of one man in front of him and by being supported at the pelvis by another man behind him.

His speech improved so that he lost the slurring and the nystagmus has disappeared. In a letter to me on September 27 he says:

> My walking has improved slightly. The use of my hands has improved greatly. Constipation does not trouble me now, and I have no trouble with urine since operation. My speech has improved and I feel brighter. My breathing is excellent.

Comments on These Results.

These are short histories of four patients suffering from advanced disseminated sclerosis. The results of treatment by altering the cerebral circulation are striking, progressive and lasting. It is nearly eighteen months since the first patient was subjected to operation. It is well known that disseminated sclerosis is characterized by remissions, but it is hardly likely that remissions should immediately follow operation in four consecutive cases without having some relationship to the measures adopted. The direct concomitant of these remissions is an improvement in cerebral circulation, and, in my opinion, venous congestion as an antecedent to sclerosis is a factor in causing the symptoms of this disease. It is obvious that the earlier in the course of the disease the patients are subjected to treatment, the more hope there will be for complete recovery. The hyperactivity of the vasomotor centre, as a result of cerebral venous congestion, must not be forgotten as a factor leading to bulbar and spinal vasoconstriction and thus to altered reflex activity. It is possible, and in fact probable, that the delay in relaxation and absence of oscillations in the knee jerk are signs of increased tone due indirectly to hyperactivity of the vasomotor centre. On account of the contralateral fall in blood pressure and amelioration in the disordered function of abdominal organs following operation upon the thoracic sympathetic trunk it is highly probable that sympathetico-tonus will be a term equivalent to activity of the vasomotor centre. This has been considered in a previous paper.

Conclusions.

1. Thoracic trunk section relieves immediately and progressively symptoms of disseminated sclerosis. It immediately alters the signs of the disease.

2. The earlier the patient is subjected to operation the greater the hope of complete relief.

Reference.

(1) N. D. Royle: "Observations on the Alteration of the Circulation of the Brain by Surgical Means in Diseases of the Central Nervous System", *The British Medical Journal*, June 11, 1932.

SOME ANATOMICAL FACTS INFLUENCING OBSTETRIC PRACTICE.

By E. B. HEFFERNAN, M.B., B.S. (Melbourne),
Melbourne.

DURING twenty years of general practice, including a large proportion of midwifery cases, I have found some anatomical factors which influence the purely mechanical management of pregnancy and parturition in Australian women. These are as follows:

1. The rarity of contracted pelves and the comparative frequency of large pelves.

2. The development of funnel-shaped pelves, particularly in those women who have indulged freely in sport throughout their school lives and afterwards.

3. The tendency towards definite disproportion between the fœtal head and the pelvic brim in the last few weeks of pregnancy, in spite of the large number of normal or even roomy pelves.

4. Owing to the large average size of the Australian baby, there is considerable overstretching of the maternal abdominal muscles during pregnancy.

There are many disadvantages associated with a large pelvis. The chief are:

1. Tendency to prolapse (retroversion with some descent of the uterus and definite cystocele) may be seen even in a *nullipara*. The early months of pregnancy require careful management in the case of a large pelvis. The tendency to descent of the uterus is best combated by adequate rest and postural treatment. A ring pessary is rarely necessary.

2. During the whole pregnancy the presenting part lies low, causing pain and "bearing down", with relaxation of the vaginal outlet, often associated with intractable *pruritus vulvæ* and varicosity of the vulval veins.

3. From the sixth month onwards the fœtal head rests heavily on the pelvic floor, and in the last three weeks of pregnancy either rises to rest in and even above the brim at term or remains in the pelvis, causing severe backache and great pain on standing or walking. The latter condition I consider an indication for induction of labour two to three weeks before term to save overstretching of the pelvic floor as well as to spare the patient's nervous system.

4. After parturition the vaginal outlet is usually relaxed, the uterus lies low and tends to be displaced backwards. During each subsequent pregnancy there is an increasing tendency towards incarceration and abortion and a greater degree of prolapse after each succeeding parturition.

The funnel-shaped pelvis, except in the case of an exceptionally small fœtus, calls for induction of labour even as early as six weeks before term. These cases must be watched carefully during the last two months, as it is difficult to determine the comparative sizes of the fœtal head and the lower pelvic canal.

The tendency towards disproportion between the fœtal head and pelvic brim I have endeavoured to overcome by inducing labour from two to three weeks before term, as the fœtal head increases in size so rapidly during this period.

Overstretching of the abdominal muscles causes the patient much discomfort, such as pain along the thoracic arch, and cramp during the later months of pregnancy. When this stretching is very distressing, even in the absence of marked disproportion between the presenting part and the pelvic brim, I would consider induction of labour near term justifiable.

After parturition these overstretched muscles regain very slowly and never fully their normal tone. The patient often complains of exhaustion, backache, giddiness *et cetera*; all these symptoms are due to lack of mechanical support to the abdominal viscera.

The wearing of an elastic maternity belt from the fifth month onwards relieves the strain on the abdominal muscles to a very great extent.

The fitting of a suitable corset (with extra support for the lower part of the abdomen) before the patient gets up after her confinement adds greatly to her comfort and together with massage and exercises is a great factor in restoring normal tone to the abdominal muscles.

The same method of induction has been used during the period of twenty years in over five hundred cases.

Under general anæsthesia the vagina is carefully cleansed and the membranes are ruptured as far back as possible to prevent the too rapid escape of *liquor amnii*. In a *primipara* the cervix is first dilated digitally to admit two fingers. The vagina is then plugged and a tight abdominal binder is applied, while 0·5 cubic centimetre of pituitrin is given every hour for not more than six doses until labour begins. Rarely are more than four doses required. The babies, of course, being premature, are treated with greater care, every precaution being taken against loss of heat during and after delivery. During the whole series of cases only one baby died as a result of premature birth; and in that particular instance my instructions regarding the care of the baby were not adhered to.

Comparing those cases in which labour was induced with those in which it was refused, I find that any danger due to prematurity in the infant is more than counterbalanced by the avoidance of head injuries, cerebral hæmorrhage and other accidents associated with difficult labour. The

mothers also show less morbidity. There is definitely less injury to the pelvic floor and perineum, apart from less relaxation of the outlet due to less strain during delivery. If any actual tearing occurs, the healing is more rapid, as the tissues have been subjected to less pressure. There is, on the whole, a more rapid recovery from the shock of parturition, as these patients have been spared the nerve strain and the great physical discomfort of the last weeks of pregnancy.

Reports of Cases.

A RECENT ACUTE CASE OF LEAD POISONING OCCURRING IN BRISBANE AND ASSOCIATED WITH HÆMATOPORPHYRINURIA.

By HAROLD CRAWFORD, M.B., B.S. (Melbourne),
Brisbane.

N.S., AGED four years, was seen on August 22, 1932, with a history of frequent attacks of intestinal colic associated with vomiting. The child was a "nail-biter" and the family lived in a painted wooden house.

On examination the patient was sallow, the breath was odorous; the teeth were in good condition and showed no lead line. The abdomen was somewhat distended, but showed no rigidity or tenderness. There was a moderate cloud of albumin in the urine, but no reducing agent was present. A quantitative estimation of the lead in the urine revealed only a minute amount. The child was debilitated; there was some weakness of the limbs due to this, but no wasting or tenderness, and reflexes were present. The condition improved under treatment.

On October 3, 1932, there was a recurrence of the vomiting and abdominal pain. The urine contained a moderate cloud of albumin; also a reducing agent for Benedict's solution. (This disappeared within a few days.) Tenderness was present in the left renal angle. The temperature was 36·9° C. (98·4° F.).

On October 10, 1932, the patient developed pains and weakness in the lower limbs. There was no paralysis of the feet, but definite impairment of the muscular power was present. That evening there were three prolonged cerebral seizures; the weakness of the lower limbs progressed and complete extensor paralysis of both feet, flaccid in type, developed. There was no neck rigidity. Kernig's sign was absent. The temperature was normal.

On October 13, 1932, the child became comatose. The urine was drawn off and was dark in colour (port wine colour). On spectroscopic examination by Dr. Gutteridge, after concentration of the pigment, the band of hæmatoporphyrin was demonstrated. The mental condition improved, but the paralysis progressed to the extensor of the leg and pain in the limbs disappeared.

On October 17, 1932, blood examination by Dr. Gutteridge revealed 4,470,000 red cells per cubic millimetre, 12,200 white cells per cubic millimetre, hæmoglobin value 75%, and colour index 0·8. There was considerable variation in the shape and size of the red cells. No stippling of the red cells was seen. The patient developed signs of congestion at the bases of both lungs. The temperature was 37·4° C. (99·4° F.).

There was commencing weakness of the extensors of the wrists, which progressed to complete paralysis. The hæmatoporphyrin continued to be present in the urine. A quantitative analysis still revealed only a minute quantity of lead in the urine.

Bronchopneumonia supervened and the child died on October 20, 1932.

Subsequently the younger brother, who was also a "nail-biter", was examined and showed early signs of lead poisoning, intestinal colic and increasing sallowness, and a deposit of albumin was present in the urine. Treatment was given, the mother broke the child off the habit of nail-biting, and a change was made to a locality with a higher altitude and a cooler climate. Since then I have examined the boy and found him to be free of any evidence of lead poisoning.

Analysis has been made by the Government Analyst of paint scrapings from two parts of the house with the following results: (i) From the outside wall and railings of the veranda 90% of white lead was present in the pigment. This part was recently painted with a paint labelled "non-poisonous". (ii) In the pigment from the kitchen wall there was 85% of white lead. This had been painted with a lead paint seven years previously.

Discussion.

I am reporting a fatal case occurring recently in Brisbane with:

1. The history of ingestion of lead.
2. The fact that the younger brother developed similar early signs and symptoms, which cleared up under treatment.
3. Early history of intestinal colic, sallow complexion, and mild degree of anæmia.
4. Cerebral seizures and a flaccid type of extensor paralysis not associated with neck rigidity, Kernig's sign, or rise in temperature. There was also tenderness of the muscles, which is a fairly common sign and has been noted by me in other cases. It is often a preparalytic stage.
5. The presence in the urine of hæmatoporphyrin, which, according to Todd and Sanford,[a] is usually observed in association with "organic liver diseases, lead poisoning, and continued use of sulphonal, trional and tetonal".

I consider this to be a definite case of lead poisoning even in the absence of:

1. Demonstration of stippling of the red cells. Unfortunately, no special technique to demonstrate this was carried out. However, it is not invariably present. The stippled red cell represents a young type of cell, and many observers report its absence in undoubted cases of lead poisoning. It occurs more often in those cases associated with more advanced anæmia, especially when such is preceded by hæmorrhages.
2. The lead line. There was no associated gingivitis and the child had received careful dental attention.
3. An appreciable amount of lead in the urine. This is not uncommon in those showing nervous manifestation without advanced renal changes.

Lead in any form is rapidly absorbed by protein bodies and is present in the circulation in combination with such, so that, unless there is gross damage to the renal tissues, little protein is excreted and so small amounts only of lead may be present in the urine.

Reference.

[a] Todd and Sandford: "Clinical Diagnosis by Laboratory Methods", Sixth Edition, 1928, page 162.

Reviews.

GRAY'S ANATOMY.

AN old and trusted friend, "Gray's Anatomy", retains its popularity as evidenced by the appearance of the twenty-fifth edition.[1] The original edition, published in 1858, the work of a young man who died soon afterwards of smallpox at the age of thirty-four, was much less elaborate than the present large tome edited by Professor T. B. Johnston. Much of the original work remains, but with the passing years whole sections have been rewritten.

The only really new portion in the recent issue is the section on surface anatomy. This has been recast. The section on embryology includes much of the new work of Professor J. E. Fraser.

The opening chapters dealing with histology form a valuable addition to a text book of anatomy, and certainly

[1] "Anatomy, Descriptive and Applied", by Henry Gray, F.R.S., F.R.C.S.; Twenty-Fifth Edition; Edited by T. B. Johnston, M.B., Ch.B.; 1932. London: Longmans, Green and Company. Royal 8vo., pp. 1492, with 1303 illustrations, of which 607 are coloured. Price: 42s. net.

leave little to be desired in detailed descriptions of the subject.

English terms have been substituted for B.N.A. terminology in the section of arthrology. This may or may not appeal to readers. It certainly does not clear up the difficulty of nomenclature. Such a term as "glenoidal labrum" is neither English nor Latin, and it would probably be better to stick to one or other of the well known terms.

The illustrations of bones are up to the usual high standard.

An interesting feature of this book is the insertion here and there of a note on the function of the part described, the otherwise dull reading being rendered quite entertaining.

The sacro-iliac joint is rightly described as a diarthrosis and not an amphiarthrosis as was formerly supposed. The sacrum might have been discussed in a little more detail, especially the variation in its formation, since radiology has drawn attention to the practical importance of this region.

The sexual differences in the male and female pelvis are more accurately described than is usual in a systematic text book. Sesamoid bones are discussed in a word or two. More detail would be of help, especially to radiologists.

The debatable subject of the movements of the shoulder joint, that is, the relation of scapula and humerus in abduction, is cleared up. Valuable sections illustrating the soft tissue relations of the joints such as hip and shoulder provide students with much help.

As usual, the pelvic fascia and muscles receive scant consideration and leave plenty of room for controversy between the student and gynæcologist. The paragraphs on applied anatomy at the end of each section are brief, but very good. Exception must be taken to the use of the term "thecal paronychia" in describing a tendon sheath infection.

Woollard's recent work on the nerve supply of the heart is included and his beautiful microphotographs are reproduced. The coloured plates illustrating the vascular anatomy and the relations of the peritoneum are old friends and are of the well known excellence. The arterial supply of the sigmoid-rectal junction is described in detail, a confused subject for the student of applied anatomy thus being elucidated.

The venous sinuses and diploic veins of the skull are very carefully described and illustrated. The lymphatics are especially well done and that excellent treatise, "Poirier and Charpey", has been drawn upon for many of the diagrams and figures.

Modern research in cancer dissemination has provided new matter and free use has been made of this.

In the sections of neurology the usual descriptions of the central nervous systems have been improved by invoking the aid of comparative anatomy in explaining the structure of the more complex parts. This is a valuable addition to the subject. The summary of muscle supplied by individual nerves is a useful page of reference.

The chapter on the autonomic nervous system includes reference to the recent work of Beattie, Brow and Long. Boeke's earlier conclusions on the dual innervation of striated muscle by somatic and sympathetic fibres are quoted as if they were actually a fact.

The description of the final distribution of the sympathetic, that is, *vid* plexuses to viscera, and also the vascular nerve supply is, as usual, inadequate and much is left to the imagination.

The systematic description of the various organs is so thoroughly done that criticisms of such an excellent volume is like biting the hand that fed one, but mention must be made of the fact that many excellent drawings have appeared in the literature of recent years which might be employed to illustrate complicated developmental processes. As an example: the rotation of the gut is still a difficult subject for the student, but the inclusion of such diagrams as those of Norman Dott would clear the matter up and save pages of confusing text.

This combination in one volume of a text book of embryology, histology and systematic anatomy leaves little to be desired, despite comment to the contrary, and students and practitioners wishing to keep abreast of modern anatomical knowledge are recommended to invest in a new edition of "Gray's Anatomy". It gives the lie to the unfounded statement, fortunately heard only occasionally nowadays, that anatomy is a "dead" subject.

A TEXT BOOK ON PSYCHIATRY.

So many text books on psychiatry have appeared in recent years that one views a new text book with a certain degree of scepticism. But "The Principles and Practice of Psychiatry" has so many novel features that it holds the interest in spite of its many glaring faults and defects.[1] To present a comprehensive survey of psychiatry, with its numerous ramifications, in a space of 429 pages is truly a Herculean task, and it cannot be said that the authors have altogether attained their object. Whilst admitting that any reader will criticize such a book in the light of his own views of what is important and unimportant, it is nevertheless true that the subject matter is extraordinarily uneven. Relatively enormous space is devoted to a description of psychological tests of doubtful clinical value. Most elaborate systems of case taking, which can seldom or never be used clinically, are detailed. It is unnecessary to devote ten pages of valuable space to a description of the classification of mental diseases as used by various authors and in different countries. Surely the 50 pages in the appendix, which are devoted chiefly to neurological diagrams of doubtful clinical value and the dose of various drugs, could be much more profitably devoted to matters purely psychiatric! It appears to us that the authors have concentrated too much on what is unimportant and have unduly cramped themselves on much more important subjects. Their description of the various mental diseases, for example, is scrappy and elementary and is of far more value for a medical student than for an advanced student of psychiatry, whom the authors professedly seek to interest. Having thus cramped their style, the authors write dogmatically, and thereby expose themselves to severe criticism. This dogmatism is apparent, not only in their descriptions of diseases, but also in their various methods of treatment, many of which Australian psychiatrists will most bitterly criticize. And again this dogmatism leads to statements which are not scientifically correct. It is surely incorrect, for example, to say: "A delusion is a false belief" (page four). And yet in spite of such extraordinary inequality and such glaring defects, the book has interested us more than most books on psychiatry. The authors hold the attention in spite of the antagonism they arouse and, having read the book, one is anxious to read it again. The authors repeatedly make brilliant observations and compel us to think in spite of ourselves. The chapter on psychiatry and the law, the synopsis of various diseases of the endocrine glands, the remarks on various laboratory tests, are all extremely fine and well worth reading. To Australian psychiatrists the chapter on the English *Lunacy Act* of 1930 (provided one has the patience to wade through the legal phraseology used) is of great interest. On reading this much vaunted English Act, one devoutly hopes that Australian politicians will not be seized with the same ideas of reform. To sum up: We have here a book, written in the traditional English style, with a most extraordinary inequality of subject matter. It is a book which aims high, but fails to attain its object. It is a text book on psychiatry which is written dogmatically and by that very fact invites criticism and controversy. It is a book which holds our interest by its frequently recurring brilliant observations and deductions. It leaves us with strangely mixed feelings, but above all with an earnest desire to read it again. If one cares to foretell the future, one would say that for such a book a ready sale can be predicted, but that subsequent editions will be most drastically revised and rewritten.

[1] "The Principles and Practice of Psychiatry", by A. Cannon, M.D., and E. D. T. Hayes, M.D.: 1932. London: William Heinemann (Medical Books) Limited. Crown 4to., pp. 454, with 150 illustrations. Price: 25s. net.

The Medical Journal of Australia

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References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE BLOWFLY IN SHEEP.

BLOWFLY strike in sheep is one of the most serious difficulties with which the sheep owner has to contend. The ravages of the blowfly have been computed to cost Australia in bad years something in the neighbourhood of four million sterling *per annum*. Since the prosperity of Australia is largely dependent on the production and sale of wool, the eradication of the blowfly pest is a subject that should interest every member of the community. The Council for Scientific and Industrial Research and the Department of Agriculture of New South Wales have been working for some time on the problem. These two bodies appointed a special committee about twelve months ago for the purpose of coordinating research activities. The special committee comprised the following members: Dr. J. A. Gilruth, Dr. R. J. Tillyard, F.R.S., Dr. H. R. Seddon, Mr. W. B. Gurney and Dr. I. M. Mackerras. This committee has issued a report which traverses the whole range of the subject.[1] The report has been edited by Dr. R. J. Tillyard and Dr. H. R. Seddon. It contains a wealth of detail regarding the difficulties of the problem and shows how far the present state of knowledge will enable graziers to deal with them.

Blowflies which attack sheep are divided in the report into two main groups, the group of primary and that of secondary flies; there is a less important group of tertiary flies. The primary flies are so called because they are able to initiate strike in sheep; the secondary flies confine their attack to those areas which have already been struck by a fly. When a sheep is struck, maggots develop on the living animal. The primary flies produce a serious lesion, but the lesion of the secondary fly is more serious because the hairy maggots invade the skin more extensively. The types of fly in these two main groups are described and illustrated; they will not be enumerated in this place, but it should be stated that the descriptions given will be useful to those engaged in combating blowflies. The lesions resulting from primary and secondary strike are described in detail, and there is a short discussion on the cause of death following blowfly strike. The cause of death in these circumstances has not been thoroughly investigated. Early treatment is an important factor in preventing death. The disease may be acute and rapidly fatal or it may run a much more chronic course. Some sheep may recover without treatment. In all strikes bacteria are active in the struck area and the wounds produced are septic. From these wounds absorption of septic products takes place and septicæmia may occur, its degree depending on the size of the wound, the degree of drainage and the nature of the bacteria. Death from septicæmia may occur. The view is expressed that bacterial activity is an important factor predisposing to blowfly strike. This is, in the opinion of T. H. Johnston, the main factor in the causation of blowfly strike. Froggatt, in 1915, propounded the theory that strike in sheep was the result of a change of habit in the blowflies. He held that droughts were a contributing cause, and that the wholesale poisoning of rabbits had led to a great increase in the number of carcasses and consequently to a great increase in the general blowfly

[1] "The Sheep Blowfly Problem in Australia", Report Number 1, by the Joint Blowfly Committee, appointed by the Council for Scientific and Industrial Research and the New South Wales Department of Agriculture; January, 1933. Price: 1s. 6d.

population, leading directly to an increased attack on sheep. The compilers of the report state that recent researches have thrown grave doubt on Froggatt's view. They conclude that it is not clear how far droughts are related to the prevalence of strike. They conclude that the prevalence of strike in Australia is largely, if not entirely, due to a combination of two factors: (*a*) the breeding of a more susceptible type of Merino sheep, and (*b*) the accidental introduction and spread of a species of fly (*Lucilia*) specially adapted to the early stages of decomposition met with in the wool of the living sheep.

The magnitude of the problem of prevention and treatment of strike is apparent from the statement that blowflies can live for as long as three months, that they can fly at least ten miles, and that a single fly, fed on a meat diet, can produce over two thousand eggs in its lifetime. Nor does the burrowing of the maggot into the soil prior to the formation of a puparium make the problem any simpler. It would appear that the problem resolves itself into one of diminishing the susceptibility of the sheep, of preventing the breeding of flies and of causing their wholesale destruction, and of early and efficient treatment of the struck sheep. All these avenues have been explored and they are discussed in the report under the headings of crutching, jetting, breeding, the performance of the fold removal operation, dressings, trapping of flies, carcass destruction and biological control. Interest is aroused chiefly by the statement that general susceptibility of the flock may be reduced by selective breeding and that at the same time satisfactory wool quality can be retained by judicious selection. The account of the attempted introduction into Australia of the wasp, *Alysia manducator*, as a parasite of the blowfly, though the attempt was unsuccessful, shows that the whole range of possibilities has been considered.

The two bodies issuing this report admittedly have not solved the problem. Though they are rather pessimistic about the possibility of gaining biological control of the blowfly by the introduction of some parasite, it is more than likely that further research will lead to the discovery of some effective method of treating affected sheep. This report will be of the greatest value to graziers. At the same time, if the extent of the investigations and the importance of the issues involved could be made known to the general public, it would show once again that science is not foolishness and that scientists, though engrossed in their mysterious undertakings, are working for the welfare of the country.

Current Comment.

FUNCTIONAL ALBUMINURIA.

FUNCTIONAL ALBUMINURIA has long been recognized as a definite entity apart from actual disease of the kidneys. It has also been termed physiological, intermittent, remittent or cyclic albuminuria. It may be present in persons otherwise apparently in perfect health and may follow exposure to cold, muscular exertion or a full meal, especially of nitrogenous food, such as eggs. Albuminuria is sometimes associated with oxaluria and the oxalates may have been derived from the food. Muscular exercise, such as running, has been followed by albuminuria. Pavy's cyclic albuminuria has been noted between the ages of nine and forty-nine in persons seemingly in perfect health. Albumin is absent in the early morning and at night. It is uninfluenced by food and seems to depend on the assumption of the upright posture with attendant exercise during the day. Disturbed innervation, as from mental stress and worry, has been assigned as a cause in some cases. Paroxysmal albuminuria was considered by Fagge to be a form of paroxysmal hæmoglobinuria. In the absence of definite evidence as to the cause, the terms functional and physiological do not seem to be particularly apt. Such cases may persist for years without interfering with health or working capacity. There may be no other signs of Bright's disease, although occasionally urinary casts have been noted after exercise. Various explanations have been offered, such as abnormal diffusibility of albumin, increased pressure in the glomeruli (from exercise or the erect posture), temporary inactivity of the tube cells or vasomotor paralysis from disturbed innervation. In such cases critical examination must be made to exclude definite nephritis or nephrosis, and the question must arise whether such kidneys are more vulnerable than normal and whether a functional albuminuria may not later be replaced by definite nephritis. The condition is of very grave importance in the matter of life assurance or examination for the various services. Are such persons to be rejected? The condition is far from uncommon. Moxon states that there is a predisposition to albuminuria in a type of languid and weak individuals with deficient appetite. In these cases

there is some, albeit slight, deviation from normal health.

H. C. Jamieson and J. W. Scott[1] stress the importance of a mechanical factor. Many patients have lordosis. In such a correction of the error by kneeling or leaning forward causes disappearance of the albuminuria, which returns on kneeling backwards. But lordosis is not always present and albuminuria may occur in the "longitudinal" type, in which there is small upper and a long lower body. In such the diaphragm is low on standing and very high on reclining. Jehle suggests that albuminuria is due to venous stasis from kinking of the left renal vein or pinching of the vein between the aorta and the superior mesenteric artery or by the diaphragm itself. Sonne pointed out that functional albuminuria is usually unilateral. Passing the ureteral catheter on the patients who were in a lordotic position, he found that urine from the left, but not from the right, kidney contained albumin. The left renal vein in its course to join the inferior *vena cava* passes over the aorta and vertebral column and in lordotic postures is compressed, causing venous stasis in the left kidney and albuminuria. Jehle devised a simple postural test. The patient empties his bladder and drinks two hundred cubic centimetres of water. He is then placed in a horizontal kyphotic position with the knees drawn up and the shoulders supported so that the maximum kyphotic curve is in the kidney region. The bladder is emptied and the patient assumes a vertical kyphotic position. The bladder is emptied again and the patient assumes a vertical lordotic position, after which the bladder is again emptied. Albumin was present in the first specimen and after the lordotic position was adopted, but not after the kyphotic position was adopted. Jamieson and Scott examined thirty men and women by this method. Their ages were from sixteen to twenty-five. Each had albuminuria with normal heart and blood pressure and no evidence of Bright's disease. There had been no special incidence amongst them of such infections as repeated tonsillitis, acute rheumatism, scarlet fever or influenza, which might have damaged the kidneys. Jehle has pointed out that subjects with unduly long trunks have abnormally low diaphragms, hence there is a possibility of pressure on the inferior *vena cava*; consequently there was adopted the ratio between the sitting and standing height as an indication of such tendency. The ratio, termed the sitting-height index, will increase as the length of the trunk increases relative to the total height. The figures showed no significant variation from the average in the albuminuric group. Varicocele is generally left-sided and is due to back pressure in the spermatic vein. Nineteen of the twenty-two albuminuric males showed marked left-sided varicocele, significant as evidence of venous stasis in the left renal vein being a cause of albuminuria. Of the thirty persons investigated, twenty-six had lordosis. In these albuminuria was presumably due to venous stasis. It was not constant, being affected by meals and exercise. In the absence of lordosis the albuminuria may have been caused mechanically by a low diaphragm, such individuals behaving to Jehle's tests as do lordotics. The patients were all investigated by Jehle's postural tests. In all albumin was absent after the kyphotic posture and present after the lordotic posture was adopted. In some cases the preliminary specimen of urine had no albumin, which appeared only after the lordotic posture was assumed. Several patients with chronic Bright's disease were subjected to similar investigations. Albumin was found in varying amounts in all positions; it was never absent. It has been asserted that functional albuminuria may develop after albuminuria due to Bright's disease has disappeared. Presumably a damaged kidney is more likely to excrete albumin with venous stasis than is a normal one. Jamieson and Scott conclude that Jehle's test is of value in deciding whether or not albuminuria persisting in an otherwise apparently healthy person is due to organic renal disease. The postural test differentiates between functional and organic albuminuria. The common finding of varicocele or lordosis suggests a mechanical factor in functional albuminuria. When albuminuria occurs without these conditions possibly a low diaphragm may press on the inferior *vena cava*.

These investigations are interesting and possibly many cases of functional albuminuria may be thus explained, but it is doubtful if such anatomical deviations cover the whole ground. Probably many persons have such peculiarities without displaying albuminuria. H. H. Bashford was of opinion that the condition was not definitely associated with any particular type of individual nor with lordosis, oxaluria or a "nervous" disposition. J. W. Russell is of opinion that orthostatic albuminuria is more frequent than generally supposed and may pass unrecognized. It may disappear in the sitting position. Norman found a steady increase of albuminuria in boys from nine up to fifteen years of age, with a curious exception in those twelve years old. This hardly conforms with an anatomical basis. Altogether there is much yet to be learned about this condition. Probably many factors contribute to its production.

[1] *The Canadian Medical Association Journal*, February, 1933.

STAB WOUNDS OF THE HEART.

THAT stab wounds of the heart are not always hopeless is shown by a recent report of F. Beekman.[1] He reports two cases; one was fatal, the other was not. In the fatal case the right ventricle was perforated and death occurred rapidly from loss of blood. In the second case the wall of the left ventricle was penetrated; cardiac tamponade developed and was relieved by aspiration. The patient was operated on later and recovered after a stormy convalescence.

[1] *Archives of Surgery*, March, 1933.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

The Influence of Endometrium upon the Rabbit Ovary After Hysterectomy.

J. VALTON SESSUMS AND DOUGLAS P. MURPHY (*Surgery, Gynecology and Obstetrics*, March, 1933) have undertaken the study to determine if structural changes occur in the ovary of the rabbit as a result of hysterectomy, the nature of such changes, and whether the loss of endometrium is a factor in bringing about these changes. They investigated 64 adult rabbits on which hysterectomy was performed, half of the number receiving at the same time autotransplants of endometrium in the abdominal wall. They were killed at periods varying from six to nine months after hysterectomy, and the ovaries were examined. They found that hysterectomy on the rabbit inhibits the development of œstrus and brings about changes in the microscopic structure of the remaining ovaries. Implantation of endometrium at the time of hysterectomy has a tendency to limit the extent of the changes in the ovaries. The authors are of the opinion that the endometrium produces a hormone that in some way influences the ovary.

Early Diagnosis of Carcinoma of the Cervix.

WALTER SCHILLER (*Surgery, Gynecology and Obstetrics*, February, 1933), of the gynæcological clinic, University of Vienna, has studied methods of early diagnosis of carcinoma of the cervix. He carried out a systematic examination of over one thousand uteri, carefully investigating any changes occurring in the cervix. He has proved that there is an early stage, which is usually called a precancerous stage, but which he calls a carcinomatous stage, in all malignant new growths of the cervix. Many of these can be detected by means of the colposcope; but this is not practicable in out-patient work. In order to locate the suspicious pre-malignant areas more quickly and easily, he devised a method of vital staining with Lugol's solution. He discovered the fact that normal epithelium of the cervix contains glycogen in its superficial layers, but no carcinomatous epithelium. This glycogen can be stained on the living patient with iodine and potassium iodide solution. When the normal cervix is painted with ordinary Lugol's solution (iodine 1, potassium iodide 2, water 300), the epithelium acquires in about half to one minute a mahogany brown colour, but in areas in which some pathological process is present, no brown staining takes place, and the epithelium remains white and unstained. Thus, diseased spots in the epithelium are easily made visible in about one minute. A cervical speculum is placed in the vagina, and, from a small cup with a long spout, about 10 to 15 cubic centimetres of Lugol's solution are poured and spread with a tampon over the cervix and left in the vagina for about a minute. This is sucked off with a tampon, and the cervix and vagina are cleaned of the excess liquid and gently wiped. If the epithelium shows an unstained spot the presence of cancer must be suspected, and the tissue at the unstained spot must be examined histologically. Such spots, which are free of glycogen, may indicate four possibilities: (i) the presence of carcinomatous layers or incipient carcinoma; (ii) the presence of hyperkeratosis, a result of prolapse or *descensus vaginæ*; (iii) the presence of hyperkeratosis, a consequence of luetic infection; (iv) the desquamation of the upper layers of glycogenous epithelium, which may have been caused by the touching of the cervix with sharp instruments or by the rough insertion of the speculum; but these latter resemble narrow, sharp and straight scratches. He claims that this makes possible the diagnosis of carcinoma of the cervix in its very first stage. In the past few years 553 scrapings have been made from such areas, of which 140 were found to be carcinomatous. The author claims that by early diagnosis and immediate operation on minute areas of commencing carcinoma, he has raised the percentage of complete cures to 90 or 95.

Ovarian Carcinomata.

WILFRED SHAW (*The Journal of Obstetrics and Gynæcology of the British Empire*, Winter Number, 1932), in continuing his study of ovarian pathology, has taken up the investigation of ovarian carcinomata. In his series of 300 ovarian tumours there were 77 carcinomata, or 25·8%, a proportion that agrees with previous statistics. This means that one in every four ovarian new growths is malignant. Of the 77, 21 were inoperable. Of the remaining 56, there were 46 which grew directly from the ovary. Fifteen of these were papillomatous carcinomata, 18 were pseudomucinous carcinomata, nine were glandular and solid carcinomata, and four were atypical. In the series there were seven metastatic ovarian tumours, of which three were Krukenberg tumours, and three were associated with carcinoma of the body of the uterus. The author divides ovarian carcinomata for general descriptive purposes into papillomatous, pseudomucinous, glandular and solid carcinomata. He points out that this enables the tumour to be grouped as papillomatous, loculated or solid, from its naked eye characters. The various subdivisions of the groups into which the tumour should then be placed can be recognized only by microscopic examination. He gives the histological characteristics of each sub-group in detail. Ascites is a common finding in cases of malignant disease of the ovary. It probably depends on two factors, namely: the irritation of the peritoneum caused by the pelvic tumours, and the secretion of the cells forming the peritoneal implantations. In the 21 inoperable cases ascites could be demonstrated clinically in only nine, that is, 42·6%, and in the 56 cases in which operation was performed, well marked ascites in only 25, or 46·43%, which is lower than is usually expected. Advanced malignant ovarian tumours are characterized by fixation of the tumour, which is almost invariably produced by direct spread of the growth. There were no metastases in scars in the author's series, because a large number of the patients were subsequently treated with X rays. He finds that metastasizing by way of the blood stream is uncommon, and the lymphatic spread of carcinoma of the ovaries is overshadowed by the formation of peritoneal metastases. Pain was noted in 34 cases, or 74%. It was almost invariably abdominal, usually severe, though rarely producing vomiting. Swelling was complained of in 24 cases, or 52%. Micturition symptoms were noted in ten cases, or 21·7%. The tumours were bilateral in 33 cases (71%). Ascites was present in 18 cases (39%). Secondary deposits were recorded in 26 cases (56%). Adhesions and infiltration were found in 18 cases (39%). Thirty-one *per centum* of the total cases were inoperable. Of the 46 patients operated on, only seven have survived. The primary mortality was seven in 46 cases of primary ovarian carcinoma. The author asserts that X ray treatment prolongs the lives of the patients, not by many months, but definitely, in each case. His statistics show that the best results are obtained in cases in which surgical removal has been followed by X ray treatment. This is the line of treatment that he recommends. In advanced and in inoperable cases the author is of opinion that exploration should be undertaken only for the purpose of deciding the diagnosis.

OBSTETRICS.

Diabetes and Pregnancy.

S. LIEBMANN (*Monatsschrift für Gebürtshulfe und Gynäkologie*, July, 1932) reviews the present standpoint as regards the treatment of diabetes during pregnancy. The details of twelve patients treated in the pre-insulin era are given. The prognosis was so poor that induction of abortion was performed in eight instances at the request of the physician. This pessimistic attitude has now been changed, and in a series of four cases, the mothers were safely carried through pregnancy by diet and insulin therapy, and living children were born at full term. Interruption of pregnancy is indicated only when, despite intensive treatment, acidosis and coma supervene, or when the cooperation of the patient as regards diet is impossible. He has not had good results

with the substitution of synthalin for insulin. The children of women suffering from severe diabetes should be weaned; but this is not necessary when tolerance is good and the insulin dosage small.

The Pregnancy Kidney.

LICHWITZ (quoted by *Deutsche Medizinische Wochenschrift*, February 17, 1933) writes that the conception that the *primum movens* leading to kidney disorder of pregnancy arises from the chorionepithelium, seems justified. Clinically it is not due to a pathological body formed in the chorionepithelium, but to excess absorption of a physiological body. "Pregnancy kidney" may appear as a chronic nephritis, as a true nephrosis, or with the picture of hypertension. It is worthy of note that the three types of kidney disease so sharply separated in the classification should arise on the same pathogenic foundation. He differentiates hypertonus from angiospasm, and separates cases with and without high blood pressure. There are many causes of high blood pressure, but its origin is due to an upset of the central nervous system endocrine mechanism. The renal symptoms, œdema, albuminuria, altered albumin-globulin ratio, lowering of colloid osmotic pressure, hypercholesterolæmia, rise of blood pressure, and angiospasm, are physiological changes in pregnancy. The different types of "pregnancy kidney" are no more than a pathological increase of the usual changes occurring in pregnancy. The prognosis is especially unfavourable when there is an angiospastic diathesis. Recovery or chronicity depends on the duration of the toxic agent. In the management of these cases, the blood pressure must be carefully controlled, and due watch kept on the subjective and objective angiospastic symptoms, so that pregnancy can be interrupted before the changes have become permanent.

Puerperal Peritonitis.

L. N. PYRAH AND C. OLDFIELD (*The Journal of Obstetrics and Gynæcology of the British Empire*, February, 1933), after reviewing the literature on puerperal general peritonitis, discuss the condition from historical, anatomical, pathological and clinical aspects. From their observations in thirty-six cases they consider that puerperal peritonitis is, in a large number of cases, a local disease, and not a focal manifestation of a septicæmia, as has so often been stated. An abscess of the wall of the uterus was present in ten cases in the present series. A diagnosis of general peritonitis is very difficult. There occur so very few symptoms and signs referred to the abdomen, and the condition may only be discovered *post mortem*. Early cases are those in which peritonitis develops within four days; delayed cases, those in which more than four days elapse before the onset. In early cases puerperal sepsis is recognized before the peritonitis sets in. The onset of peritonitis is signalized by a gradual and insidious change for the worse. Symptoms referred to the abdomen are sometimes very slight; usually there is some discomfort. The first sign is usually distension of the lower part of the abdomen, and, in some cases, diarrhœa. Usually there is tenderness in the hypogastric and iliac regions. Hyperæsthesia of the skin can often be demonstrated. Rigidity of the abdomen is usually absent, and this fact is responsible for many failures of diagnosis. The time of death is twenty-four hours to three or four days after the onset of peritonitis. In delayed cases the onset may be insidious, or, as in thirteen of the present series, sudden and dramatic, in patients who were apparently making satisfactory progress. Typically, the onset is associated with a triad of symptoms: rigor, abdominal pain, and greatly increased pulse rate. In the delayed type the pain is usually severe, appetite is lost, and vomiting is not a constant symptom. Painful micturition, and, not uncommonly, retention of urine have been noted. The authors have not operated upon a patient suffering from gonococcal peritonitis, and believe this type to be more suited to palliative treatment. A factor of great importance in the differentiation of general from local peritonitis is a gradual or sudden change for the worse in the general condition of the patient, especially if it be associated with the triad of symptoms: rigor, abdominal pain, and pulse rate above 100 per minute. In local peritonitis the patient does not look so ill and the pain is local. The authors give as their considered opinion that operation is essential in all cases of general puerperal peritonitis due to any organism other than gonococci; for they have not found reasonable evidence that, in any such cases, spontaneous recovering has occurred. Local peritonitis is treated conservatively unless the abscess bursts and produces general peritonitis. General peritonitis is treated by drainage by the abdominal route; the vaginal route is used as an accessory. One tube is inserted into the pouch of Douglas, one in front of the uterus and one in each flank, if necessary. The authors do not advise hysterectomy. A plea is made for an attempt at early diagnosis in order to lower the mortality figures. In the present series of thirty-six patients, seven were admitted in an almost moribund condition and were not operated upon, six died within twenty-four hours of operation, and eleven recovered.

Delayed Chloroform Poisoning.

H. J. STANDER (*American Journal of Obstetrics and Gynecology*, June, 1932) reports a case of delayed chloroform poisoning in which the total amount of chloroform was 75 cubic centimetres (two and a half fluid ounces). Biochemical examination revealed a lowered degree of carbon dioxide combining power of the blood, hypoglycæmia, an increased destruction of protein, and a lowering of the alkali reserve. The first symptoms of delayed chloroform poisoning usually occur two or three days after the anæsthetic. Vomiting or jaundice may be present; drowsiness, stupor and coma are always present. Urinalysis always shows increased nitrogen excretion with a high ammonia coefficient and low urea nitrogen. At autopsy central necrosis of the liver is found. Treatment consists in the intravenous administration of alkalis and glucose. The author is against the use of chloroform, excepting in whiffs in the second stage. It is particularly to be avoided in suture of the perineum, when full surgical anæsthesia is necessary.

Simultaneous Intrauterine and Extrauterine Pregnancy.

A. A. GEMMELL AND H. LEITH MURRAY (*The Journal of Obstetrics and Gynæcology of the British Empire*, February, 1933) report two cases of simultaneous intrauterine and extrauterine pregnancy. They have secured records of 213 cases reported in the literature. They find that the condition is a serious one, and has a mortality rate of 20·7%. Some cases are only discovered *post mortem*. It is reported that three patients have proceeded to term after the removal of the *corpus luteum*. In one of the authors' cases a tubal gestation, the size of a sausage, was removed, and, six months later, the patient was delivered of a baby weighing 3·6 kilograms (eight pounds). One of the cases, which was not truly one of simultaneous intrauterine and extrauterine pregnancy, was reported in *The Australasian Medical Gazette* of 1890, by Way; another was reported by Worrall in 1904, and another by T. Wilson in 1907, also in *The Australasian Medical Gazette*.

Leuchæmia and Pregnancy.

H. O. NEUMANN (*Deutsche Medizinische Wochenschrift*, February 19, 1932) describes the effect of pregnancy on cases of chronic myelogenous leuchæmia, and appends the histories of several cases in detail. His results show that, if pregnancy ensues within two years of the onset of the illness, the pregnancy can be safely permitted to proceed to term, and that labour will not be inimical to life. But if pregnancy does not occur until a later date, or if it be repeated, the mother runs serious risks, unless the pregnancy be terminated. There may not be any urgent symptoms; but death often occurs during the puerperium. Hæmorrhage is uncommon. As regards methods of sterilizing such patients, he prefers intrauterine application of radium in a dose of 2,270 to 3,620 milligramme-hours. It has the advantage over operative treatment of avoiding the risks of hæmorrhage. In conclusion, he emphasizes the fact that prevention of pregnancy in such cases is of more importance than any discussion on when to interrupt the pregnancy.

Special Articles on Treatment.

(Contributed by Request.)

VIII.

THE TREATMENT OF ACUTE GONORRHŒA IN THE MALE.

BEFORE undertaking the treatment of acute gonorrhœa in the male it is necessary that the practitioner should thoroughly understand the pathological histology of the disease. It is commonly believed that infection begins in the region of the *fossa navicularis*, and that during the first twenty-four hours from the time of exposure to infection, the organisms are located on the surface of the mucous membrane. By means of appropriate prophylactic treatment during this period the gonococci can be destroyed and the disease prevented. After this period such treatment is of no avail from the point of view of prevention, for the reason that the organisms are beginning to migrate between the layers of columnar epithelium to the submucosa, and to invade the crypts of Morgagni and the glands of Littré, so that no method of local treatment can reach them. Having taken up their abode in the deeper tissues, they begin to incubate, multiply and cause an intense inflammatory process, resulting in a discharge of pus, which is usually seen about the third to fifth day. Furthermore, it must be remembered that gonorrhœa is not altogether a local disease, for gonococci have frequently been cultured from the blood of uncomplicated acute cases. If the gonococci remained on the surface, the disease would with consummate ease be cured by a simple process of injecting germicides, but as this is not the case, the physician must realize the difficulties which confront him. There are three main factors which are concerned with the cure of gonorrhœa: first, the general resistance of the patient; secondly, the local resistance of the lesions involved; and, thirdly, the assistance given by promotion of tissue responses by the use of the correct chemical substances. Where any one of the above factors is found wanting even in spite of the most carefully regulated treatment, the eventual cure becomes long and tedious. Having regard to these considerations, the practitioner is in a position to prescribe carefully a suitable method of treatment.

Advice to Patient.

At the outset the patient should be warned as to the seriousness of his disease, that he must not give up treatment until assured of cure by his doctor. Half-hearted cooperation between practitioner and patient usually leads to bad results, and so as to insure the necessary cooperation, the patient should make frequent visits to the surgery. After handling of the genitals the hands should be washed with soap and water so as to avoid contamination of the conjunctiva. Articles of toilet must be strictly guarded, contamination of baths and water closets must be avoided in order to prevent transference of the infection to others; particularly does this apply when there are small girls in the household. The patient should be particularly warned as to his mode of life, for any indiscretion during the course of the disease will most certainly delay cure. For example, any condition which tends to lower the resistance of the patient, such as keeping late hours, excessive smoking and indulgence in alcohol in any shape or form, cycling, riding on horseback, all forms of strenuous exercise are to be avoided, and sexual excitement must be debarred. No matter how good the local treatment, if the above-mentioned rules are not observed, results are indifferent, so that the patient's salvation lies largely in his own hands. Much has been written with regard to the prohibition of certain articles of diet, but experience has proved that the ingestion of these foods has little or no effect on the course of the disease. The patient should be allowed good, wholesome food, including meat, otherwise his life will become a misery and thereby his natural resistance will suffer. He should be instructed to drink large quantities of water, which tend to correct the influence of irritating foods, and to micturate frequently, which serves the useful purpose of irrigating the urethra from behind. Attention should be paid to the bowels, and it is a good practice to order a good dose of opening medicine at the outset.

Drug Treatment.

No medicine as yet has been proved to be a specific for gonorrhœa, being merely prescribed for the alleviation of symptoms and sometimes as a *placebo*. For this purpose a simple mixture containing potassium citrate 1·2 grammes (20 grains) and potassium bicarbonate 1·0 gramme (fifteen grains) to 30 cubic centimetres (one fluid ounce) is useful, as is also a gelatine capsule containing sandalwood oil 0·6 mil (ten minims) and methylene blue 0·015 gramme (one-quarter of a grain), given three times daily. Particularly is this capsule useful in acute inflammation of the posterior urethra. Morphine 0·015 gramme (one-quarter of a grain), prescribed as a suppository, is sometimes necessary for the pain of acute inflammation of the posterior urethra.

Vaccines.

Vaccines have largely fallen into disfavour in the treatment of acute uncomplicated cases of gonorrhœa, but have been universally used in cases with systemic involvement. Experiments carried out at the Rochester Row Military Hospital by Thomson and Lees in 1919 proved that when large doses of detoxicated vaccine were used, gonococci disappeared from the discharge in less than half the number of days than in cases treated without vaccine. The administration of vaccine in acute gonorrhœa seems to be quite logical for the purpose of improving the patient's resistance. Detoxicated gonococcal vaccine is given intramuscularly into the upper and outer quadrant of the buttock in doses increasing from 2,500 millions to 10,000 millions, every fifth day.

Local Treatment.

The patient is instructed to procure a roll of cotton wool, a packet of gauze, "jock strap" or a pair of bathing V's, and also a small all-glass syringe with a blunt point. The wool is cut into squares and inserted on the inner surface of the "jock strap" or bathing V's for the purpose of catching the discharge? Gonorrhœa bags and plugs of cotton wool are not to be used, nor is anything to be tied around the penis, for by so doing drainage is interfered with. In patients with long prepuce a strip of gauze is placed over the *glans penis* and then the prepuce is pulled forwards. This dressing prevents the discharge from accumulating in the sulcus, thereby causing an infection of Tyson's glands, which are situated one on either side of the frenum.

The two methods of choice for local treatment are: (*a*) irrigation from douche can, (*b*) injection by small all-glass syringe. Most experts prefer the large syringe of 150 cubic centimetres capacity for irrigating purposes, but unless the operator is thoroughly practised in the technique of its use, more harm will be done than good. In general practice, therefore, the douche can method with special irrigating apparatus is to be preferred. This apparatus should always be kept in the surgery of the practitioner and be sterilized before use each day. The patient must not be allowed this method for home use, because of the possibility of introducing secondary infection.

For the purpose of injecting the urethra, a small all-glass syringe with a blunt point should be prescribed, and the physician should give instructions as to its use. The patient is allowed to treat himself at home by this method, injecting one of the organic silver salts which will later be described.

By the use of irrigating solutions we can only hope to destroy and wash away the organisms on the surface, together with the pus and mucus, thereby rendering the mucous membrane an unsuitable medium for the growth of bacteria. At the same time they promote drainage, and when used in suitable strengths create certain tissue responses. They are best prescribed in weak solution, and

no good purpose can be served by prescribing them in strong solution, for the reason that they promote too much tissue response and thereby damage the tissues, sometimes beyond repair. The same can be said with reference to solutions for injecting the urethra by means of the small syringe.

Many antiseptics have been prescribed for the treatment of gonorrhœa, most of them proving their worth, but it is generally considered that potassium permanganate, used in a strength of one in 8,000 for irrigating purposes, is the most suitable. For injection of the anterior urethra, one of the organic silver salts is best prescribed, preferably protargol 0·25% to 0·5%, and for the posterior urethra, argyrol 5%.

In treating the urethra particular care must be observed in the prevention of trauma, which is the most common cause of complications. For the technique of irrigation and injection the reader is referred to the recognized text books.

The routine treatment of acute gonorrhœa of the anterior urethra consists in daily irrigation with potassium permanganate solution (one in 8,000) and injection of protargol solution (0·25%) two or three times a day as well. The solution must not be allowed to enter the bladder in the early stages. When the disease runs a normal course, this method of treatment is continued until the symptoms and signs disappear, with the exception that in the decline the number of injections are decreased. At every visit a macroscopic examination of the urine is made; for by this means one is able to follow the course of the disease, and also frequent smears from the discharge should be examined, the number of pus cells, epithelial cells, and the presence or absence of gonococci being noted. When many epithelial cells are noted in the smear, it means that the treatment is too severe.

It is bad practice to insert a sound, bougie, medicated or otherwise, into the urethra, in acute cases, or even to pass a soft catheter, except in acute retention of urine as a last resource. The treatment of acute gonorrhœa by means of medical diathermy, although never very popular, has fallen into disuse.

No mention has been made so far of abortive treatment, for the reason that, although it is obvious that the earlier the infection receives treatment, the shorter the duration of the disease, this result is obtained by the ordinary methods of treatment above described just as quickly and very often more effectively than by the more enthusiastic methods advocated.

When strong solutions are used in an attempt to abort gonorrhœa, the tissues are devitalized, and irreparable damage is done in the shape of infiltrations of the urethra.

Certain acute complications sometimes arise during the course of acute gonorrhœa, such as paraphimosis (which is treated by immediate reduction), intense swelling of the *glans penis*, abscess of Tyson's glands, and periurethral abscess, the latter conditions being treated by bathing with hot water or hot fomentations. Early incision of Tyson's abscess is recommended, otherwise it might rupture into the urethra and cause urinary fistula, but in periurethral abscess, incision is not resorted to until the abscess points on the skin surface. In hyperacute conditions it is advisable not to begin treatment for a few days.

One must always be on the lookout for the onset of posterior urethritis, which may happen at any time after the first few days. It is usually ushered in by the lessening or disappearance of the discharge, more or less urgent frequency of micturition, with varying degree of pain at the end of the act, and perhaps the expression of a few drops of blood. Frequently there are no symptoms other than that the urine becomes turbid; this explains the reason why it is so necessary to examine the urine before treatment. When the posterior urethra first becomes involved it is necessary to suspend all forms of local treatment, to advise rest and prescribe morphine, 0·015 gramme (one-quarter of a grain) suppository or oral treatment, combined with hot sitz-baths until the acute symptoms disappear and the act of micturition becomes normal again. Then urethro-vesical lavage may be commenced, using potassium permanganate solution (one in 8,000) or injecting 5% argyrol solution into the posterior urethra by means of a small syringe. These manipulations must be carried out with the utmost care, and unless the practitioner is sure of his technique and is confident that he is not going to produce trauma, they should not be attempted, otherwise severe and long-lasting complications may arise. When the posterior urethra becomes infected, the prostate and *vesiculæ seminales* frequently become involved, either mildly or sometimes severely. Acute inflammation of these organs is treated on the same lines as for acute posterior urethritis. When abscess formation takes place, combined with retention of urine, immediate prostatotomy should be performed. Examination *per rectum* should never be performed whilst the disease is in its acute stage, except for the purpose of detecting an abscess. When the acute and subacute stages have subsided, the disease becomes localized in certain areas, such as the Littré glands of the anterior urethra, or perhaps the prostate gland or seminal vesicles *et cetera*. It then becomes necessary to eradicate the infection by means of dilating the urethra with curved metal sounds and topical treatment by means of the urethroscope, and also by massage of the prostate and seminal vesicles.

One is unable to lay down any set time for the cure of acute gonorrhœa, because it depends entirely upon the many considerations which have been described in this article.

NORMAN M. GIBSON, M.B. (Sydney).

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Medical Society Hall, East Melbourne, on February 2, 1933, DR. W. G. D. UPJOHN, the President, in the chair.

The Treatment of Arthritis Deformans.

DR. HORACE PERN read a paper entitled: "The Treatment of Arthritis Deformans" (see page 573).

DR. FAY MACLURE congratulated Dr. Pern on his interesting paper and said that there were many lessons to be learned from Dr. Pern's work. He was a country practitioner, working without the extensive facilities of X ray departments and pathological laboratories; and, working alone, he had arrived at a sound knowledge of the principles of treatment of arthritic and allied conditions of joints. Dr. Pern's work constituted a challenge to those working in large public hospitals, with every mechanical facility, and where, even now, the methods of treatment of joint lesions were in some cases unsatisfactory. Dr. Maclure said that he had recently read an article in *Chambers's Journal*, by Sir Herbert Barker, now retired from active practice. The writer offered to instruct medical practitioners in his methods of bone manipulation free of charge. In Dr. Maclure's opinion, much was to be learned from such methods. Manipulative surgery had been unduly neglected by many modern surgeons. He had also been interested in Dr. Pern's observations on the age distribution of various types of arthritis. Regarding movement of inflamed joints, his own sheet anchor of treatment in traumatic and suppurative conditions of joints was to allow active movement short of pain. There had been schools of practice, however, particularly in the war period in Belgium, in which passive movements were insisted on to the extent of carrying out the movements by means of elaborate apparatus, so that Dr. Pern's conclusions had the support of competent authority. He thanked Dr. Pern for his address; it would act as a stimulus to teachers in a subject which had tended to be neglected in the past.

DR. H. D. STEPHENS said that *arthritis deformans* was not common in children, but many children suffered from active suppurative and non-suppurative disease of joints.

Dr. Pern's treatment of joint lesions without splints or appliances was hardly applicable to children, especially in the acute stages. Dr. Stephens himself had used Wilm's method of treatment, using active movement of affected joints, avoiding pain. He asked Dr. Pern to explain why he did not advocate direct traction, especially in acute cases.

DR. H. G. MITCHELL said that he had arrived late and had missed Dr. Pern's opening remarks, but asked whether he considered removal of septic foci had any effect on chronic joint conditions.

DR. VICTOR HURLEY congratulated Dr. Pern on his valuable paper. It was particularly interesting in that it represented the results of actual work done and of personal observation. Dr. Hurley considered that Dr. Pern was wrong in supposing that it was a disadvantage to be working in an isolated community with a rather limited number of patients and without elaborate mechanical aid. Under such conditions he was able to follow up the results of his treatment, which had in most cases been successful, and to keep the majority of his patients under personal observation for a long period of time. This was impossible with most patients of the hospital class in capital cities. Dr. Pern's methods of personal supervision and great patience in giving detailed treatment would tend to achieve better results than those obtained in a large hospital; for there it usually happened that such patients were referred for actual treatment to massage departments, where they received more or less unsupervised manipulation, diathermy *et cetera*. In acute cases Dr. Hurley said he preferred splintage to the bandages *et cetera* recommended by Dr. Pern. Regarding prognosis in joint cases, Dr. Hurley continued, it was important to come to an opinion as early as possible as to whether one was likely to obtain a movable joint eventually. This was, of course, not to be hoped for in tuberculosis, but when there was the least possibility of obtaining a movable joint, then the conservative methods advocated by Dr. Pern were indicated and held out the best hope of success.

DR. J. W. OSTERMEYER asked what internal medical treatment, if any, Dr. Pern advocated. Dr. Ostermeyer felt that Dr. Pern had concentrated on the mechanical aspect of joint disease almost to the exclusion of the biochemical and immunological aspects.

DR. J. E. NEWMAN MORRIS congratulated Dr. Pern on his paper, and referred briefly to the method of treatment he had seen recently in England and elsewhere. He had asked Dr. Böhler, of the Vienna Accident Hospital, who had been himself a general practitioner for many years, to what he attributed his remarkable results in cases of limb and joint injury. Böhler replied that he considered he owed one-third to physical treatment and two-thirds to psychological treatment. Dr. Morris asked Dr. Pern whether he used anæsthesia in effecting forcible passive movements.

In reply, Dr. Pern said he had spent many months in the preparation of his paper, first, because he felt that to give less than his best would be an insult to an audience of the calibre of his hearers, and, secondly, because of his real love for the work. He considered that the results of treatment of joint lesions in the past had not been worthy of the best ideals of the profession. In reply to Dr. Mitchell, Dr. Pern said he doubted whether septic foci had been proved as the cause of arthritis. In reply to Dr. Ostermeyer, he said that his medical treatment had been empirical. He gave sodium salicylate combined with potassium bicarbonate with tincture of gelsemium and tincture of hyoscyamus in the early stages, and in later stages combined sodium salicylate with calcium carbonate. Dr. Pern said that he felt sure the disease was curable in the acute stages and should not be allowed to drift on into the chronic state so often found. He thought that anæsthesia was ideal for manipulation in painful cases, but owing to distance and expense it had not been possible for him to use it for this purpose. He had been forced to depend on extreme gentleness, a gradually acquired sense of touch, and a moral ascendancy over the patient, who at first was usually resentful both of his joint disease and of the pain caused in treatment.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Waddell, Harry James, M.B., 1911 (Univ. Sydney), Casino.

Hewitt, Lance Ellis, M.B., B.S., 1930 (Univ. Sydney), Singleton.

The undermentioned has been elected a member of the Victorian Branch of the British Medical Association:

Vincent, Frank Robertson, M.B., B.S., 1930 (Univ. Melbourne), c.o. Dr. C. Maxwell, Melbourne Road, Frankston.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING OF THE MELBOURNE PÆDIATRIC SOCIETY was held at the Children's Hospital, Melbourne, on April 12, 1933, DR. REGINALD WEBSTER, the President, in the chair. The meeting took the form of a series of clinical demonstrations.

Morquio's Disease.

DR. D. O. BROWN showed two patients, sisters, aged nine years and twelve years respectively, to illustrate a familial bone dystrophy first described by Morquio. The mother was similarly affected. The elder girl had been brought to hospital in 1930, complaining of abdominal pain. She had suffered from bacilluria, which had been treated and cleared up completely. Soon afterwards she had complained of constant pain in the leg; X ray examination had revealed the condition. At the time of the meeting the girl was 1·24 metres (four feet one inch) high and weighed 25·4 kilograms (four stone four ounces), so that, although slightly below the average height and weight, she was not a dwarf. There were some lordosis and a pot belly. The head was normal in circumference, as opposed to the large head of achondroplasia. There was no stigma of congenital syphilis or dyspituitarism. The limbs and hands were perfectly proportioned and normal, again as opposed to the short limbs and trident hands of achondroplasia. There were flexion deformities of ten degrees and five degrees, respectively, of the right and left hip joints. There were marked limitation of external rotation and abduction at both hip joints, as in Perthes's disease. There was a lower thoracic kyphosis. The mentality was slightly retarded. Blood calcium and blood phosphorus contents were normal. There was no reaction to the Wassermann test. The sugar tolerance was normal. Examination of all the other systems revealed no abnormality.

The younger sister complained only of pain in the left leg and a limp. Examination showed that this girl also was small, though not a dwarf. The head was slightly sunken into the shoulders. There was no syphilitic stigma. Both hips showed slight flexion deformity and again a marked limitation of abduction and external rotation. She also had a pronounced, irreducible kyphosis. Results of all other investigations were normal, as in the case of the elder sister.

The mother was of precisely similar stature. She had been born in South Africa and had been healthy all her life.

Dr. Brown said the diagnosis was to be made from achondroplasia and Perthes's disease. The normal head circumference and the normally shaped limbs were against achondroplasia. Apart from the other signs of Morquio's disease, such as dwarfism, the hip deformity, the kyphosis and the retarded mentality, the diagnosis rested mainly on the characteristic radiographic changes.

DR. COLIN MACDONALD said that he was indebted to his colleague, Dr. Roy Sear, of Sydney, for help in the elucida-

tion of this condition, which the Frenchman, Morquio, had first described in *Archives de Médicine des Enfants*. Dr. Brown and he deemed these cases examples of Morquio's disease or familial osseous dystrophy. Their cases had, in addition to the familial element, an hereditary one. Though there was a certain superficial resemblance to achondroplasia in the short stature, Dr. Brown had explained how markedly they differed from this well recognized disease of endochondral ossification. The skiagram of the mother's pelvis perhaps resembled that of the pelvis of true achondroplasia; but, while no exact X ray internal pelvimetry had yet been carried out on the mother, it was unlikely, with her uneventful obstetrical history, that there was the pronounced contraction of the *conjugata vera* that was so characteristic of achondroplasia. In certain radiological respects, particularly with regard to the hips and spine, these cases resembled the localized osteochondropathies, such as Perthes's disease or Scheuermann's disease. The generalized platyspondylia, shown best in the antero-posterior views, was, he thought, the most characteristic feature of the skiagrams, and apparently it was the platyspondylia and the associated kyphosis which produced the shortness of stature. In the mother's spine the expansion of the intervertebral disks into the vertebral bodies indicated that the disease had made the vertebral bodies abnormally soft, and was an example of the inherent turgor of the expansile *nucleus pulposus* of the disk, to which attention had lately been drawn by the Dresden pathologist, Schmorl. The similarity of the hips to those in Perthes's disease appeared to be some evidence in favour of the theory that he had sponsored before, that true Perthes's disease was a disorder of osteochondral growth and not an infective or traumatic manifestation. The pituitary fossæ in all three cases were small, with thickening of the *dorsum sellæ* and approximation of the clinoid processes. There was, however, no clinical evidence of pituitary dysfunction in these cases, though Dale, a Scandinavian, who had recently written on this condition, suggested that the disease was a primary endocrine disorder. Dale also regarded the condition as being intermediate between achondroplasia and local malacia, such as Perthes's disease; Dr. MacDonald could not follow Dale in this belief, as the radiological and clinical differences between familial caseous dystrophy and achondroplasia were so very marked. Rickets and congenital syphilis need be mentioned only to be ruled out as causative factors in the condition, the X ray findings being entirely dissimilar.

Dr. MacDonald remarked that sixteen cases in all of familial osteochondropathy had been recorded in the literature. First by Morquio, the Frenchman, in 1929, later by Ruggles, an American, Dale, a Scandinavian, and Brailsford, of Birmingham. The patients in these series varied in minor particulars, but were all characterized by short stature, with generalized bony changes, most marked in the spine and hips. In most of the cases there was a familial factor, and in one, like their own series, there was an hereditary element.

Post-Diphtheritic Paralysis.

DR. W. W. MCLAREN showed a girl, aged twelve years, whose illness had commenced eleven weeks previously, when she had developed headache, general malaise, pain behind the eyes, fever, cough and epistaxis. After a week she was admitted to hospital, and examination revealed a temperature of 39·4° C. (103° F.), a pulse rate of 120 per minute, and an acidotic breath. The fauces were reddened, but there was no exudate or membrane. The right nostril was blocked; but there was no nasal discharge. The apex beat was palpable in the fifth intercostal space, just outside the nipple line, and there was a systolic mitral murmur. The condition was regarded as rheumatic fever, and salicylates were given. By the end of the second week the girl was very much better, and the temperature was normal. During the third week she developed a sore throat and a husky voice, and the temperature again rose to 39·4° C. Palatal movement was poor, but equal on the two sides. Two days later she suffered from mild laryngeal spasms, with difficulty in breathing, unrelieved by big doses of phenazone. This lasted for one day only, and during the next two days there was difficulty in swallowing. There were signs of patchy consolidation in the upper lobe of the right lung. During the fourth week the temperature subsided and the lung cleared. Laryngoscopic examination revealed a symmetrical, bilateral, adductor paresis, and her voice remained a whisper until fourteen days before the meeting, since when it had gradually improved. During the sixth week she developed ptosis of the left eye, which lasted for two weeks. By this time she had lost a good deal of weight, and there was marked general weakness of the limbs and body. During the eighth week diplopia developed; it persisted for two weeks. During the tenth week there was still some diplopia and a very slight right facial paresis. Swallowing was impaired, as was also palatal movement, though there was no regurgitation of fluids through the nose. The general weakness was still very pronounced, so that the girl could not walk; but, although the deep reflexes were absent, the superficial reflexes were quite active. During the eleventh week there was great improvement; the diplopia and facial weakness cleared, general muscle power improved, swallowing returned to normal, and the voice was much improved.

At the time of the meeting there were still weakness of the forearm, back and thigh muscles, and marked paresis of the hand and leg muscles; but they seemed to be steadily improving.

DR. MCLORINAN said that against a diagnosis of post-diphtheritic paralysis in this case were the following points: the multiplicity of the lesions; the severity of the lesions, especially in the limbs; the fact that, even in the severest cases of diphtheria, laryngeal paralysis was very rare; the fact that facial paralysis was extremely rare; the severity of the limb involvement as opposed to the slight involvement of the palate and pharynx; and, lastly, the length of the illness and its severity in the eleventh week. He would agree that it was a toxic multiple neuritis; but he did not think the toxin was diphtheria.

Dr. McLaren, in reply to Dr. McLorinan, said that an illness commencing with naso-pharyngitis, complicated by paresis of the palate and larynx on the sixteenth day, and later by a multiple neuritis, was highly suggestive of diphtheria. He said that the paralyses of diphtheria did not depend on the severity of the infection so much as on the length of time the toxin was acting. While all the points raised by Dr. McLorinan held good for treated diphtheria, this child possibly had a severe and fairly prolonged untreated infection. In pre-antitoxin days there was recovery in many such cases.

Tuberculous Ulcer of the Leg.

DR. C. H. OSBORN showed a girl, aged eleven years, who had been admitted three months previously with a provisional diagnosis of cellulitis of the leg. Two months prior to admission she had injured the leg, which had swollen considerably, but slowly subsided. Two weeks before admission the swelling had recurred, with marked pitting œdema of the lower two-thirds of the leg. There was a small superficial infected abrasion, but the condition was quite painless. X ray examination revealed no abnormality of the underlying bone. *Staphylococcus aureus* was cultured from a swabbing of the surface.

The leg was encased in an Unna's stocking, but rapidly became worse. There was no reaction to the Wassermann test. During the following week the cellulitis spread rapidly, and, ultimately, a large superficial slough, as big as the palm of the hand, separated. A second culture showed a mixture of *Staphylococcus aureus* and *Bacillus pyocyaneus*. The wound was dressed daily with pyocyaneus antivirus, and improved a little. Dr. Webster, who then saw the ulcer, suggested that it might be tuberculous, and a film stained by the Ziehl-Neelsen method revealed enormous numbers of acid-fast bacilli. Dr. Webster was not able yet to state which kind of tubercle bacillus it was, but thought it probably was bovine.

The skin edges were then excised. Tubercle bacilli in enormous numbers were found in smears from the excised edges. Ultra-violet light treatment was then instituted, and there had been steady improvement in the general and local condition since. Later, it was proposed to apply

a skin graft. Because of the difficulty in grafting these large areas successfully, and because frequently there was œdema of the foot, and the grafts readily broke down and discharged for years, Dr. Osborn said he would have preferred to amputate the leg; but the parents had refused to allow him to do so.

Congresses.

THE INTERNATIONAL HOSPITAL ASSOCIATION.

THE President of the International Hospital Association has requested the publication of the following announcement:

The International Hospital Association invites to the Third International Hospital Congress at Knocke sur Mer, Belgium, from June 28 till July 3, 1933, all officials, associations, institutions, and persons who are interested in the construction, administration, and development of hospitals. The world crisis has placed the tasks which the hospitals of our day have to fulfil in such a strong and clear light that the necessity has made itself felt more than ever of exchanging the views of the different countries, and coming to an international understanding of the proper plans on which important questions should be answered. The reports of the ten International Study Committees will be laid before this congress. These have been arrived at by an international exchange of views by outstanding specialists of different countries. These reports will, in part, contain suggestions for common international principles, their purpose being not to form one uniform system, but to bring about a general perfecting and improvement in the hospital system. The references for these committees are: (i) construction, (ii) equipment and technique, (iii) administration and housekeeping, (iv) finance and bookkeeping, (v) legislation, (vi) care of the patient in the hospital, (vii) patients' food, (viii) personnel, (ix) statistics, (x) outside connexions with the hospital.

All the reports read before the congress will appear in the April number of *Nosokomeion*, the official organ of the Association, published by W. Kohlhammer, Stuttgart.

The opening sitting of the congress will take place on Wednesday, June 28, at 5 p.m. The reports of the committees and subcommittees will be presented on June 29 and 30, but will be fully discussed at the plenary sitting on July 1, 2 and 3. The results arrived at at the full gathering will be forwarded to the League of Nations and the respective governments.

From July 4 to 9 there will be a five days' study journey through Holland, which will enable the members of congress not only to see the new hospitals, but the classic places, the centres of industry and scenery of Holland.

Notifications should be addressed to the Belgium Hospital Association (*Association Belge des Hôpitaux*), 80, Rue de Livourne, Brussels, together with a contribution of two dollars. The members of the International Hospital Association, who pay a yearly contribution of five dollars, can attend the congress without further payment. In addition, they receive the organ of the society *Nosokomeion*.

All communications, questions, reports and suggestions should be addressed to Dr. W. Alter, Ernst Ludwig Allee 2, Buchschlag, Hessen, Germany.

Detailed programmes can be obtained free of charge from Messrs. W. Kohlhammer, Verlag, Urbanstrasse 12-16, Stuttgart.

Correspondence.

AN ECONOMIC COMMENTARY AND DIAGNOSIS.

SIR: It is with some reluctance that I write again to you upon this subject; my only excuse is that the importance of a thorough grasp of the fundamental truths of economics should be known to all men.

I have been a close student of economics for thirty years; so that I trust your readers, including Dr. Streeter, will realize that I have at least tried to ascertain what are the truths that this science has to offer us. Dr. Streeter and "M.B., Ch.B." consider that the Douglas credit proposals would solve our difficulties. As briefly as possible, their proposals are that, owing to the operation of the so-called "*A* and *B* theorem" in industry, insufficient purchasing power is distributed in any one industry to buy back the products of that industry. The deficiency is to be made up by issuing consumer credit and unconditional national dividend.

I have read Major Douglas's book and one other book on the subject, and I have heard several advocates speak on the proposals. It appears to me that, philosophically, the theorem is impossible. I have submitted this "*A* and *B* theorem" to a highly endowed mathematician, and he has informed me that mathematically the theorem is incorrect. Further, I have by me carefully compiled accountancy statistics as supplied to the Government Statistician by three large industrial concerns in Melbourne. A most painstaking examination of these, according to proper economic methods, discloses that the theorem is quite incorrect. These figures show that each industry in itself, and also the three combined, distribute exactly enough purchasing power to buy back the whole products of each industry, or the three combined, as the case may be.

Major Douglas and his followers have been led astray by wartime finance, and have become obsessed by the money, or credit, complex. Credit, or money, is not purchasing power, as they affirm. Purchasing power is wealth produced, or services rendered, and therefore credit now is actually where it is produced; it is the height of absurdity to propose that credit should be issued to or vested in any other set of people. The creation of further currency, no matter what it is called, or how it is camouflaged, will not increase purchasing power. A bag of wheat, let us say, will buy a motor tire; to issue credit or a national dividend will not enable a bag of wheat to buy two motor tires.

This is the fundamental mistake of most monetary reforms. They confuse credit with wealth, and therefore think that by increase of credit wealth can be created. The world is now suffering largely from this fallacy; it was the war and post-war methods of finance that misled minds untutored in economics, like Douglas and many others, to think that the boom, once initiated, could continue; but, alas, it was not so, and never will be so. We all mortgaged future production by these booms; we did not create new wealth unpaid for, and now the chickens have come home to roost.

The Douglas proposals have been carefully examined by three competent tribunals and pronounced impracticable without a single dissentient voice.

I have read Major Douglas's own evidence before the Canadian committee, and a more hopeless and evasive witness one could not imagine; hardly a question did he answer unequivocally. J. S. Mill tells us that in periods of depression we always have evanescent schemes of monetary reform. It was so in his day, and it is so now.

The solution of our difficulties lies much deeper than credit and banking, but, paradoxically, is much more simple than these. We have a country worth some £1,200,000,000, the annual rental of which is fifty to sixty million pounds. One hundred and fifty years ago the value was nil; the colossal sum represents, roughly, what the people have spent on our heritage. But the people have given away the birthright to a few; 15% of the population call Australia theirs. The other 85% have to contribute most of this high annual rent of fifty to sixty million pounds per year to live here, and in addition, pay one hundred million pounds *per annum* in taxes. The simple solution is to abolish all these taxes gradually, commencing with the most iniquitous, the sugar embargo (an act which reduces the purchasing power of the vast majority of Australians by some five million pounds a year) and other protective taxes. In lieu thereof, the annual economic rent should be collected. We would thus release all the purchasing power of the people—the fifty

million pounds for a commencement—and finally rid ourselves of the true cause of our troubles: private ownership of land and taxation.

There is only one truly national income, and therefore only one true national dividend: land value, a fund created by the community, and therefore rightly belonging to the community. To talk of issuing a national dividend other than this is sheer nonsense, and only indulged in by the ignorant or those seeking to play to the gallery.

I join with Dr. Streeter in urging our members to study economics, but not the fantastic scheme issued by Douglas credit advocates.

The only political philosophy that is in accord with ethical teaching is that of Henry George. After fifty years of attack, vituperation, abuse and silence, it remains the unshaken and unassailable citadel of true political economy.

Yours, etc.,

PAUL G. DANE.

110, Collins Street,
Melbourne, C.1.
Undated.

DIATHERMY OF TONSILS.

SIR: Why is Dr. Bettington so down on electro-coagulation? Are the results worse than tonsillectomy by the same set of people? It would profit more if we discussed "tonsils, in or out". Mr. Layton, senior laryngologist of Guy's Hospital, states he never does a tonsillectomy under eight years. I seldom do one over eight years. If Dr. Bettington and others tried the effect of hygienic measures and diathermy applied therapeutically, to their younger patients especially, it would be found that 75% of tonsil cases would get well without operation.

The interesting note of Dr. Watkins tends to prove what I have long held, that all acute infectious diseases, including the common cold, have their beginnings in the sinuses. The ordinary method of blowing the nose encourages the dissipation of dust and germs into the recesses. I would advise a flooding of the sinuses with the following: solid vaseline one part, liquid three parts, menthol one-third of a grain to the ounce.

Yours, etc.,

W. KENT HUGHES.

32, Collins Street,
Melbourne,
April 22, 1933.

Post-Graduate Work.

THE NEW SOUTH WALES PERMANENT POST-GRADUATE COMMITTEE.

WE have been asked to announce that copies of the programmes of gynæcological operations at the Women's Hospital and Lewisham Hospital will be handed to students on the opening day of this year's post-graduate course (May 29, 1933). It is pointed out that these particulars do not appear in the programme of the course recently issued by the New South Wales Permanent Post-Graduate Committee.

ANNUAL POST-GRADUATE COURSE IN BRISBANE.

THE annual post-graduate course will be held in Brisbane from May 29 to June 2, 1933. The following syllabus has been issued.

Monday, May 29, 1933.

Morning.—Operations at the various hospitals.

Afternoon.—Lecture by Dr. E. Stephen: "Blood Conditions in Childhood", at the Geological Theatre, University.

Evening.—Dance and bridge party at Lennon's Hotel.

Tuesday, May 30, 1933.

Morning.—Lecture by Dr. E. Stephen: "Acetonæmia", at the Mater Misericordiæ Hospital.
Operations at the various hospitals.

Afternoon.—Lecture by Dr. K. Inglis: "Paget's Disease of the Nipple and Its Relation to Surface Cancers and Precancerous States in General", at the Geological Theatre, University.

Evening.—Lecture by Dr. A. Aspinall: "The Operative and Post-Operative Treatment of the More Common Conditions Involving the Head and Neck", at the Geological Theatre, University.

Wednesday, May 31, 1933.

Morning.—Operations by Dr. A. Aspinall, at the Mater Misericordiæ Hospital.

Afternoon.—Continuation of lecture by Dr. K. Inglis on Paget's disease of the nipple, at the Geological Theatre, University.

Evening.—Lecture by Professor Harvey Sutton: "Physical Types Among Children", at the Geological Theatre, University.

Thursday, June 1, 1933.

Morning.—Operations by Dr. A. Aspinall, at the Brisbane Hospital.
Clinical demonstration by Dr. E. Stephen, at the Hospital for Sick Children.

Afternoon.—Continuation of lecture by Dr. K. Inglis on Paget's disease of the nipple, at the Geological Theatre, University.

Evening.—Annual dinner, Queensland Branch, at Rowe's Banquet Hall.

Friday, June 2, 1933.

Morning.—Lecture by Dr. E. Stephen: "Gastro-Enteritis", at the Geological Theatre, University.

Afternoon.—Lecture by Dr. A. Aspinall: "The Post-Operative Care of Abdominal Cases", at the Geological Theatre, University.

Evening.—The Bancroft Memorial Lecture, by Professor Harvey Sutton: "Modern Phases of Preventive Medicine", at the Geological Theatre, University.

Obituary.

SAMUEL WILLIAM HENRY SUMMONS.

WE regret to announce the death of Dr. Samuel William Henry Summons, which occurred on April 30, 1933, at Kew, Victoria.

HERBERT FRANK SHORNEY.

WE regret to announce the death of Dr. Herbert Frank Shorney, which occurred on May 2, 1933, at Adelaide, South Australia.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1912 and 1915, of New South Wales, as duly qualified medical practitioners:

Considine, Henry Lockington, M.B., B.S., 1926 (Univ. Melbourne), Ganmain.

Selby, Clive Herbert, M.B., B.S., 1933 (Univ. Sydney), Werona Avenue, Gordon.

Deans, Berwyn Lincoln, M.B., B.S., 1930 (Univ. Melbourne), School of Public Health and Tropical Medicine, University of Sydney.

Hagger, Thomas Dudley, M.B., B.S., 1930 (Univ. Melbourne), Crown Street Women's Hospital, Sydney.

Kennedy, Gerald Joseph, M.B., B.S., 1921 (Univ. Melbourne), Cobram, Victoria.
Munro, Robert, M.B., B.S., 1929 (Univ. Melbourne).

Additional diplomas registered:
Harris, Cecil Wentworth, F.R.C.S. (Edinburgh).
Money, Reginald Angel, F.R.C.S. (England).

Books Received.

THE PRACTICAL MEDICINE SERIES OF YEAR BOOKS: OBSTETRICS AND GYNECOLOGY; Series 1932; 1933. Chicago: The Year Book Publishers. Crown 8vo., pp. 679, with illustrations.

THE PRACTICAL MEDICINE SERIES OF YEAR BOOKS: PEDIATRICS; Series 1932; 1933. Chicago: The Year Book Publishers. Crown 8vo., pp. 564, with illustrations.

THE MODE OF ACTION OF DRUGS ON CELLS, by A. J. Clark, B.A., M.D., F.R.C.P., F.R.S.; 1933. London: Edward Arnold and Company. Demy 8vo., pp. 305, with illustrations. Price: 18s. net.

Diary for the Month.

MAY 16.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 17.—Western Australian Branch, B.M.A.: Branch.
MAY 17.—Victorian Branch, B.M.A.: Clinical Meeting.
MAY 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAY 24.—Victorian Branch, B.M.A.: Council.
MAY 25.—South Australian Branch, B.M.A.: Branch.
MAY 25.—New South Wales Branch, B.M.A.: Branch.
MAY 26.—Queensland Branch, B.M.A.: Council.
JUNE 1.—South Australian Branch, B.M.A.: Council.
JUNE 2.—Queensland Branch, B.M.A.: Bancroft Memorial Lecture.
JUNE 7.—Victorian Branch, B.M.A.: Branch.
JUNE 7.—Western Australian Branch, B.M.A.: Council.
JUNE 9.—Queensland Branch, B.M.A.: Council.
JUNE 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments.

THE undermentioned have been appointed in New South Wales to the positions mentioned, Office of the Director-General of Public Health, for a period of three years from March 1, 1933: Dr. I. D. Miller (B.M.A.) to be Honorary Surgeon, Liverpool State Hospital and Home; Dr. C. H. Swanton (B.M.A.) to be Assistant Honorary Surgeon, Liverpool State Hospital and Home; Dr. J. Goldman (B.M.A.) to be Honorary Anæsthetist, Liverpool State Hospital and Home; Dr. B. T. Edye (B.M.A.) to be Honorary Consulting Surgeon, Liverpool State Hospital and Home; Dr. C. M. Edwards (B.M.A.) to be Honorary Urologist, Lidcombe State Hospital and Home; Dr. F. G. Roberts (B.M.A.) to be Honorary Ophthalmic Surgeon, Newington State Hospital and Home; Dr. A. T. Nisbet (B.M.A.) to be Honorary Consulting Radiologist, Waterfall Sanatorium.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought etc., see "Advertiser", pages xvi, xvii

BUNDABERG GENERAL HOSPITAL, BUNDABERG, QUEENSLAND: Resident Medical Officer.
CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers (male).
LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer (male).
MATER MISERICORDIÆ CHILDREN'S HOSPITAL, BRISBANE, QUEENSLAND: Resident Medical Officer.
NEW SOUTH WALES MASONIC HOSPITAL, SYDNEY, NEW SOUTH WALES: Medical Officers.
PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Medical Officers (3).

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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